APPENDIX 8.B.

Jordan Cove LNG
A Pembina Company

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

February 22, 2019

Greg Apke
Oregon Department of Fish and Wildlife
4034 Fairview Industrial Drive SE
Salem, OR 97302

Re: JCEP Fish Passage Plan-Kentuck and APCO

Dear Mr. Apke,

Jordan Cove Energy Project (JCEP) hereby submits our Kentuck and APCO Fish Passage Plan to the Oregon Department of Fish and Wildlife (ODFW). In this submittal you will find:

1. Fish Passage Plan
    a. East Bay Drive Bridge
    b. Golf Course Lane Culvert
    c. Kentuck Tidegate
    d. Kentuck Creek Restoration
    e. APCO Bridge
2. Appendix A – Vicinity Maps
3. Appendix B – Design Plans
4. Appendix C – Fish Passage Hydraulic Report
5. ODFW Fish Passage Forms

We appreciate your review of this application. Should you have any questions, please contact Jay Lorenz at jlorenz@pembina.com or 425-657-9052.

Sincerely,

Natalie Eades

Natalie Eades,
Manger, Environment and Regulatory

Jordan Cove LNG, LLC

Kentuck and APCO Fish Passage Plan

Document Number:

J1-000-TEC-TNT-DEA-00039-00

Prepared for:

111 SW 5th Avenue, Suite 1100
Portland, OR 97204

Prepared by

2100 SW River Parkway
Portland, Oregon 97201

TABLE OF CONTENTS

ACRONYM LIST

°F	Degrees Fahrenheit
ODSL	Oregon Department of State Lands
dth/d	Dekatherms Per Day
FERC	Federal Energy Regulatory Commission
ft	feet
fps	Feet Per Second
HMT	Highest Measured Tide
JCEP	Jordan Cove Energy Project, L.P.
LNG	Liquefied Natural Gas
MHW	Mean High Water
MHHW	Mean Higher High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
MTR	Muted Tidal Regulator
mtpa	Million Tonnes Per Annum
NAVD 88	North American Vertical Datum of 1988
NGA	Natural Gas Act
NMFS	National Marine Fisheries Service
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
ODSL	Oregon Department of State Lands
OHWM	Ordinary High Water Mark
PCGP	Pacific Connector Gas Pipeline, LP

1. *PROJECT OVERVIEW*

Jordan Cove Energy Project, LP (JCEP) is seeking authorization from the Federal Energy Regulatory Commission (FERC) under Section 3 of the Natural Gas Act (NGA) to site, construct, and operate a natural gas liquefaction and liquefied natural gas (LNG) export facility (LNG Terminal), located on the bay side of the North Spit of Coos Bay, Oregon (Figure A.1). JCEP will design the LNG Terminal to receive a maximum of 1,200,000 dekatherms per day (Dth/d) of natural gas and produce a maximum of 7.8 million tonnes per annum (mtpa) of LNG for export. The LNG Terminal will turn natural gas into its liquid form via cooling to about -260º Fahrenheit (F), and in doing so it will reduce in volume to approximately 1/600th of its original volume, making it easier and more efficient to transport.

In order to supply the LNG Terminal with natural gas, Pacific Connector Gas Pipeline, LP (PCGP) is proposing, under a separate Section 7c NGA authorization, to contemporaneously construct and operate a new, approximately 229-mile-long, 36-inch-diameter natural gas transmission pipeline from interconnections with the existing Ruby Pipeline LLC and Gas Transmission Northwest LLC (GTN) systems to the LNG Terminal (Pipeline, and collectively with the LNG Terminal, the Project).

The Project includes estuarine habitat restoration at the Kentuck Project site (see Attachment A.1). JCEP, in communication with Oregon Department of Fish and Wildlife (ODFW) and National Marine Fisheries Service (NMFS), has identified several improvements at this site that require compliance with state and federal fish passage regulations. In addition, use of the APCO Site (see Attachment A.1) will require construction of a new bridge, also requiring compliance with fish passage regulations. State fish passage regulations are guided by ODFW under Oregon Administrative Rule (OAR) 635-412-0035, and federal fish passage requirements are guided by NMFS under the NMFS Anadromous Salmonid Passage Facility Design guidance document prepared in July 2011.

Project information included in this report is specific to components that trigger state and federal fish passage regulations. Additional project details are available in various state and federal permit applications and the FERC record. The sections below provide a brief overview of the components specific to fish passage, and additional design and construction details for each component. Attachments include general overview vicinity maps (Attachment A), site-specific aerial images and design plans (Attachment B), hydraulic analysis for the Kentuck Project site (Attachment C), and ODFW Fish Passage Stream Crossing Forms (Attachment D).

1.1 KENTUCK PROJECT

To mitigate for loss of wetlands and waters, and for impacts to estuarine habitat, JCEP proposes to construct the Kentuck Project, consisting of the Tidal Reconnection Area and the Freshwater Floodplain Reconnection Area. The Tidal Reconnection Area will restore tidal connectivity to approximately 67 acres of historic tidelands within a former golf course site (the Kentuck Project site), resulting in a diverse array of habitat types including mudflat, tide channels, salt marsh, and fringing freshwater wetlands. The Freshwater Floodplain Reconnection Area will connect with Kentuck Creek, above the Tidal Reconnection Area, and therefore will provide approximately 10 acres of restored freshwater wetland floodplain and fish habitat. Construction activities at the Kentuck Project site include earthwork and civil

infrastructure improvements to re-establish a tidal connection. In general, site improvements include providing tidal exchange to the site by constructing a bridge through existing road embankment, raising a roadbed above the tidal influence (i.e. above HMT of 10.26 ft. NAVD88), providing freshwater flow to the site through a new tidegate, creating new channels and floodplains, and constructing fish habitat features. The tidal and floodplain reconnection will allow ecosystem processes to function naturally.

Fish passage is addressed at the following proposed Kentuck Project components:

1. East Bay Drive Bridge
2. Golf Course Lane culvert
3. Kentuck tidegate
4. Kentuck reconstructed channels upstream and downstream of the proposed tidegate

1.2 APCO SITE

The APCO Site is a proposed dredged material disposal site located on the south shore of the bay at the south end of the Highway 101 bridge, and immediately north of North Bend (Attachment A.1). Dredged material from Coos Bay might be distributed between APCO Site 1 (mainland) and APCO Site 2 (island), or entirely at APCO Site 2. Management of dredge material at the APCO Site will require the construction of a single-lane permanent bridge between APCO Site 1 and APCO Site 2, as well as a temporary bridge to construct the permanent bridge, in order to provide access to the site for heavy equipment including, but not limited to, excavators, dump trucks, and bulldozers. The permanent and temporary bridges are fish passage triggers and are discussed in detail in Section 3.5 below.

2. *FISH PASSAGE PURPOSE AND CRITERIA*

This fish passage plan is specific to the LNG Terminal, and addresses fish passage compliance at proposed channels and structures at the Kentuck Project site and the APCO Site in Coos Bay (see Attachment A.1). Pipeline-related fish passage compliance is addressed in separate documentation. This plan addresses both permanent design-related and construction-related fish passage.

The sections below outline how proposed structures, channels, and temporary construction work comply with state and federal fish passage requirements under OAR 635-412-0035, and the NMFS Anadromous Salmonid Passage Facility Design guidance document. Where applicable, the ODFW Memorandum "Clarification of Fish Passage Triggers and Guidelines for Bridges," dated March 28, 2008 (ODFW 2008), is referenced in this document.

Specific citations of the ODFW and NMFS fish passage criteria are provided below as they relate to individual project components. In addition, the hydraulic report in Attachment C references specific ODFW design criteria and outlines how the Kentuck Project is in compliance with those specific criteria.

3. *FISH PASSAGE STRUCTURES AND CHANNELS*

3.1 EAST BAY DRIVE BRIDGE

A new bridge will be installed along East Bay Drive to facilitate tidal reconnection to the site and will allow for free exchange of tidal water from Kentuck Inlet (see Attachment B.1). A section of the current causeway will be removed and replaced with a bridge that is 36 feet wide and 67 feet long (measured between center of bents) with a hydraulic opening of approximately 60 feet. The bridge will consist of concrete slabs and deck span, and have vertical sheet pile surrounding each bent (Attachment B.1).

The new East Bay Drive Bridge will allow full-time tidal connectivity to the restored estuarine habitats, allowing free movement of fish and other aquatic organisms into the area. The impacts to the area below the Highest Measured Tide (HMT) will be removal of existing riprap, construction of the new bridge bents, and placement of riprap at the corners of the bridge that will be incorporated into the existing roadway riprap. The channel bed material beneath the bridge will consist of native marsh sediments.

The work area will remain isolated from Kentuck Inlet during construction, and work within the isolated area could occur year round. The isolation measures will be in place until bridge construction work is complete. A traffic detour route will be established to the east and stay in place while the bridge is being constructed.

3.1.1 ODFW Fish Passage Compliance

The bridge design will meet ODFW fish passage criteria by applying hydraulic criteria. Velocities beneath the bridge are less than 2 feet per second (fps) and greater than 1 foot in depth (OAR 635-412-0035(2)(c) and (e); see Attachment C, Hydraulics Report, Section 5.3.1).

Construction of the East Bay Drive Bridge will comply with ODFW fish passage requirements during construction by isolating the work areas from tidal influence and fish before the start of construction or excavation activities. The bridge construction footprint is not currently accessible to fish, nor is it part of Kentuck Inlet.

3.1.2 NMFS Fish Passage Compliance

The design of the new 60-foot bridge complies with NMFS passage design guidelines in Section 7.2 (NMFS 2011) by restoring ecological function to the former golf course site. Although the entire road causeway of East Bay Drive between the former golf course and Kentuck Inlet cannot be removed, the new bridge will restore ecological function by allowing movement of wood debris, flood and ebb tides (longitudinal connectivity), native sediment, and fish and other aquatic species.

3.2 GOLF COURSE LANE CULVERT

Due to tidal inundation of the Kentuck Project site, Golf Course Lane will be raised approximately 3 to 8 feet in elevation above its existing location. As a result, a new culvert will be installed under Golf Course Lane to maintain drainage from an unnamed tributary entering the Kentuck Project site (see Attachment B.2). The tributary has an active channel width of approximately 4 feet and is currently impounded by an earthen dam. The dam creates a pond above the elevation of the existing Golf Course Lane. The earthen

dam and pond will be removed as part of the Project, and a new fish-passable culvert will re-establish hydraulic connectivity between the tributary and the Kentuck Project site. The new culvert will eliminate the perched condition of the existing pipe and restore a connection to stream habitat that has long been rendered impassible to anadromous species.

The proposed open-bottom culvert will be nearly 67 feet long and 9 feet wide. An aluminum plate culvert with a concrete collar will be founded on parallel concrete footing runners. The culvert will allow a minimum 3.5-foot vertical clearance inside the structure between the low-flow channel and the top of the culvert. The downstream end of the low-flow channel is a few inches lower than the MLW elevation of 2.90 feet. The culvert will be subject to tidal influence and may be completely submerged during high tide. The upstream flow from the tributary is minimal to non-existent during summer months; therefore, the channel may go dry during low tide under natural conditions. A culvert slope of 0.5% and a 2-foot-wide low-flow channel in the culvert will allow fish to use the channel during a broad range of low tides and freshwater flows. The culvert slope is consistent with the existing grade downstream of the former pond. The natural bottom of the culvert will include natural streambed material consisting of native gravel- and cobble-sized material, and partially buried boulders for hydraulic shadow, bed retention, and channel roughness. The material will be sized based on hydraulic analysis to prevent them from washing out during high flows. Culvert plans are provided in Attachment B.2.

During construction, fish and other aquatic organisms will be removed from the pond in coordination with the local ODFW biologist. The channel downstream of the proposed culvert location will be screened to prevent fish entry into the work area. If the upstream channel has flow at the start of construction, a barrier and bypass pipe will be provided to allow downstream passage of aquatic organisms without allowing entry into the work area. Upstream passage is not possible under existing conditions. Work will occur during the ODFW-approved in-water work window (July 1 to September 15).

3.2.1 ODFW Fish Passage Compliance

The culvert design, as it is described above, meets ODFW's Stream Simulation Option criteria listed in OAR 635-312-0035(3)(a)(A) (i-v). Additional depth and velocity information is provided in Section 5.3.3 of the Hydraulic Report (Attachment C). Fish passage during construction will comply with OAR 635-412-0035(10), as discussed above.

3.2.2 NMFS Fish Passage Compliance

The culvert will comply with NMFS guidelines for salmonid passage listed in Section 7.4.2 (NMFS 2011) for channel width, slope, embedment, length, materials, water depth, and velocity. Vertical clearance within the culvert is proposed to be a minimum of 3.5 feet between the low-flow channel and the top of the culvert. It is understood that clearances less than 6 feet may require an inspection and maintenance plan to ensure that the culvert will remain free of debris during the passage season.

3.3 KENTUCK TIDEGATE

To allow for continuity and restoration of ecological processes to occur between Kentuck Inlet, the Kentuck Project site, and Kentuck Slough, a tidegate fitted with a muted tidal regulator (MTR) will be installed towards the upstream end of the site to create a direct connection between the restored tidal area and Kentuck Slough (see Attachment B.3). This MTR, or tidegate, will minimize water velocity and maximize both water depth and the time the tidegate door is open. The tidegate will continue to allow a direct connection of Kentuck Creek through Kentuck Slough to the existing MTR tide gate on East Bay Drive.

The MTR tidegate will be located below the confluence of Kentuck and Mettman creeks, and will allow fish full access to both of these drainages. The proposed location of the tidegate, as well as the relocation of the portion of the levee that will separate the Kentuck Tidal Reconnection Area from the Kentuck Freshwater Floodplain Reconnection Area, is based on two competing factors: (1) the desire to restore as much of the site as possible to its historic estuarine condition and (2) the desire to avoid the potential for impacts of salinity intrusion to adjacent property owners. Oregon Department of State Lands shows the historic head of tide occurring at the northeast corner of the overall Kentuck Project site, near the confluence of Mettman Creek with Kentuck Creek. NMFS has expressed the desire to place the MTR structure as close to this historic head of tide location as possible. However, modeling efforts have shown that a plume of saline water could travel as much as 1,000 feet upstream of the MTR location, particularly during times of low stream flow. Therefore, as a precaution to the upstream property owner and to gain support with the Kentuck Drainage District, the proposed location of the MTR was shifted 1,000 feet lower than the historic head of tide location. Similarly, the proposed new levee was shifted southward on the property to provide a further buffer between the Kentuck Tidal Reconnection Area and the adjacent property owner. In addition to reducing property owner concerns, the shifting of the levee farther to the southwest also has the benefit of providing important freshwater floodplain wetland habitat that ODFW and NMFS have expressed would have particular benefits to Coho salmon smolts that are not yet ready for the more saline conditions that would occur in the tidal reconnection portion of the Kentuck Project site.

The tidegate structure is essentially a bridge fitted with two gates. The overall structure length will be 21 feet between end bents (measured perpendicular to flow) and 16 feet wide (measured parallel to flow). The abutments are stabilized with riprap, and the bridge corners each have sheet pile wing walls to limit fill material around the tidegate. The proposed tidegate will be topped with an access road for maintenance and a walking path for recreational use.

Each gate opening will be 8 feet wide and 10 feet high. The proposed tidegate will include one MTR gate and one standard side-hinge gate, oriented side by side in the structure (see Attachment B.3). The MTR gate will operate based on the water surface elevation upstream of the structure (the slough side), and is designed so that it maintains sufficient flow for fish passage, limits saltwater intrusion upstream of the structure, and provides for limited flood risk reduction. The operational parameters of the side hinge gate and MTR are included in Section 5.3.2 of the Hydraulics Report (Attachment C).

3.3.1 ODFW Fish Passage Compliance

The tidegate will meet ODFW fish passage criteria for OAR 635-412-0035(2)(a), (b), (c), and (4). Specifically, the Kentuck tidegate will comply as follows:

- At 8 feet wide each, the gate openings are greater than the minimum required opening of 4 feet.
- The tidegates meets requirements listed in OAR 635-412-0035(2) within the design flow range for 52.2% of the time, which is greater than the 51% required.
- The calculated maximum velocity is 3.5 fps, compared to the required maximum velocity of 8 fps for design flows in discrete fishway transitions between the fishway entrance/exit.
- The minimum depth for the proposed structure is 1 foot, which is equivalent to the passage criteria.

Fish do not currently have access to the tidegate work area. During construction, isolation measures will prevent fish and flowing water from entering the work area from Kentuck Slough, so that construction of the tidegate will remain in compliance with OAR 635-412-0035(10).

3.3.2 NMFS Fish Passage Compliance

NMFS does not currently have fish passage criteria for tidegates.

3.4 KENTUCK CREEK RESTORATION CHANNELS

The existing ditched main channel through the Kentuck Project site runs for approximately 6,000 feet before draining via a tide-gated culvert under a small levee on the east side of East Bay Drive (see Attachment B.4). Water then flows under East Bay Drive via a 10-foot-diameter fish-passable culvert owned by Coos County. The existing 10-foot-diameter culvert under East Bay Drive will be removed or plugged, and the small levee with the tide-gated culvert just east of East Bay Drive will be removed.

A restored stream channel will be constructed throughout the Kentuck Project site. The mouth of the channel will be located at the new East Bay Road Bridge and will be the primary tide channel in the restored Tidal Reconnection Area. The channels will be graded to approximately elevation -2.0 feet NAVD88 at the downstream end to approximately elevation 0.0 feet at the upstream end. MHW elevation is 5.14 feet, therefore the entire site will be influenced by high tide. Tidally influenced areas will branch out to connect to secondary tide channels, small tributaries, and habitat ponds. The channel will continue through the new Kentuck tidegate and connect back to the slough and to a new alignment of Kentuck Creek through the Freshwater Floodplain Reconnection Area. Existing tributaries that drain into the Kentuck Project site will also connect with the enhanced main channel.

The channel sinuosity in the Freshwater Floodplain Reconnection Area will be increased to approximate, estimated historic conditions, and the channel cross-section will simulate a natural channel rather than the current partially maintained ditch-like channel. The existing channel will be plugged at its upstream end where it enters the site to divert water to the new channel, while the remainder of the existing channel will be left in place as a backwater habitat feature and to allow flow inputs from Mettman Creek.

All channels will be designed to prevent entrainment of fish throughout the entire tidal range. In an effort to reduce any unwanted harm to aquatic species, areas of refuge will be created to increase survivability. Instream habitat features, such as large wood and habitat pools, will be included to support salmonids. Restored freshwater and tidal channels are shown in Attachment B.4.

3.4.1 ODFW Fish Passage Compliance

Section 5.2.4 of the Hydraulics Report (Attachment C) provides hydraulic modeling results and indicates how the channels comply with ODFW fish passage criteria, specifically OAR 635-412-0035(2)(c)(A) for water velocity, and (e) for water depth. The width of all channels exceeds 12 inches, in accordance with OAR 635-412-0035(2)(f).

During construction, work areas will be isolated from active flowing channels, and fish will be isolated and removed from work areas. Upstream and downstream fish passage will be provided in compliance with OAR 635-412-0035 where passage currently exists. Attachment B.4 includes plan sheets showing the construction phases.

3.4.2 NMFS Fish Passage Compliance

The channels comply with NMFS fish passage criteria for transport channels outlined in Section 4.4.2 of the NMFS guidance (NMFS 2011) for velocity, dimensions, lighting, and design. Per Section 4.4.2.1, the higher end velocity is less than 4 fps. Some 95% velocity values are less than 1 fps; however, these are due to the ebb tide. Consistent with Section 4.4.2.2, the channels are at minimum 4 feet wide and at least 5 feet deep in the floodplain of the tidally influenced area. The design of the channels complies with the general design criteria stated in Section 4.4.2.4.

3.5 APCO BRIDGE

Vehicular access will be required between APCO Site 1 (mainland) and APCO Site 2 (island) for management of dredged material. A permanent single-span bridge that is 200 feet long and nearly 40.5 feet wide will span a tidal mudflat for the purpose of providing access to and from the disposal site. It will include an 8-foot-wide sidewalk on the bridge deck. The bridge will include two concrete abutments on pile-supported footings and be placed above the HMT. Material-stabilized earth walls extending landward from the abutments will eliminate the need for fill material to extend below the HMT or wetlands. The steel plate girders for the new bridge will be assembled and installed onsite. Precast deck panels will be installed between each of the four steel girders, and a cast-in-place concrete deck will be poured over the steel girders and deck. Permanent and temporary bridge plans are provided in Attachment B.5.

Construction of the new single-span bridge will begin with construction of a temporary work bridge. The temporary work bridge will be approximately 30 feet wide and 280 feet long and have seven 40-foot spans. The temporary work bridge will be placed north of the proposed permanent bridge. It is likely that the temporary work bridge will use three steel piles per bent, and have a steel frame and a steel or concrete bridge deck. The temporary work bridge will begin and end in dry land. The end bents will be outside the HMT boundary, while five of the interior bents, including fifteen steel piles, will be installed below HMT. The temporary bridge will be constructed to avoid placing steel pile in the low-flow tidal

channel beneath the bridge (see Attachment B.5). The temporary work bridge will be in place for less than 24 months.

3.5.1 ODFW Fish Passage Compliance

The permanent APCO bridge will comply with fish passage criteria by spanning the HMT, or active channel width (OAR 635-412-0035(3)(a)(A)(i)).

The temporary bridge bents are not likely to occupy more than 10 feet of the active channel, viewed perpendicular from the 280-foot-long bridge. Applying Alternative 1 from ODFW's memorandum dated March 28, 2008, "Clarification of Fish Passage Triggers and Guidelines for Bridges" (ODFW 2008), ODFW is comfortable that hydraulic constrictions of 25% or less will not significantly impact water velocity to warrant further documentation (page 4, footnote 14 of the ODFW memorandum).

To demonstrate compliance with OAR 635-412-0035(10)(a), JCEP requests that ODFW's approval include authorization to leave pile in place during construction, including outside the site-specific in-water work period of October 1- to February 15. The temporary bridge will not require diversions or fish collection and removal.

3.5.2 NMFS Fish Passage Compliance

The permanent bridge will comply with NMFS fish passage criteria by spanning the active channel at the bridge location, allowing normative physical processes to be maintained (NMFS 2011, Section 7.2).

4. *CONCLUSION*

The Project includes estuarine habitat restoration at the Kentuck Project site and use of the APCO Site, which will require construction of a new bridge. Each of the related project components, as discussed above, complies with ODFW and NMFS fish passage criteria. The table below shows results of the fish passage hydraulic modeling or a how the components comply with fish passage regulations.

Table 1 – Fish Passage Results Summary for Proposed Project Components[1]

Project Component	Passage Criteria Method	Maximum Velocity[2] (feet/second)	Minimum Depth[2] (feet)	Tide Cycle Passage
East Bay Road Bridge	Hydraulic	0.9	4.8	n/a
Golf Course Lane Culvert[3]	Stream Simulation / Hydraulic	0.6	2.4	n/a
Tidegate with MTR	Hydraulic	3.5	1	52.2%[4]
Channel: Tidal Reconnection Area	Hydraulic	1.4	1.4	n/a
Channel: Freshwater Reconnection Area	Hydraulic	1.8	2.2	n/a
APCO Bridge (permanent and temporary)[5]	Large Scale Crossing	n/a	n/a	n/a

1. Values are summarized from the Kentuck Fish Passage Hydraulic Report (Attachment C).
2. Maximum velocity criteria is 2 ft/second, except in fishways, and minimum depth criteria is 1-foot. Values shown represent the higher velocity and lower depth of the 95% and 5% design flows.
3. Meets OAR 635-412-0035(2) and NMFS (2011) Section 7.5.2 (hydraulic method) and OAR 635-41-0035(3)(a) and NMFS (2011) Section 7.4.2 (stream simulation method).
4. Meets OAR 635-412-0035(2) requirements for an average of 51% of tidal cycles.
5. Per ODFW (2008), the permanent and temporary bridges comply with fish passage criteria as a Larger-Scale Crossing Design. The temporary bridge occupies less than 25% of the channel so no further documentation is required. The full span permanent bridge is compliant with NMFS (2011) Section 7.2.

5. *REFERENCES*

NMFS (National Marine Fisheries Service). 2011. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.

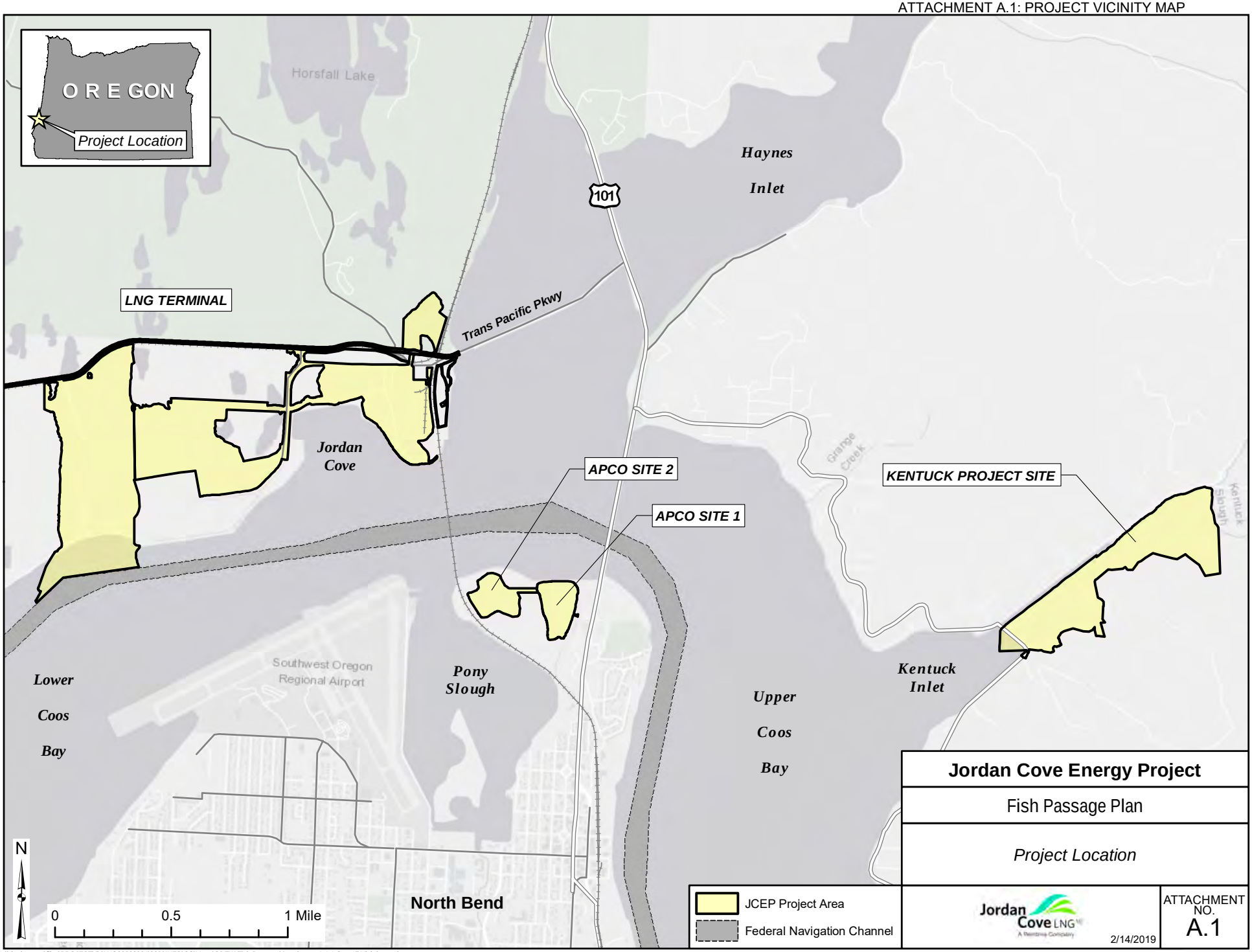
Oregon Administrative Rules (OAR). 635-412-0035: Fish Passage.

ODFW (Oregon Department of Fish and Wildlife). 2008. Memorandum: Clarification of Fish Passage Triggers and Guidelines for Bridges. From Tom Stahl, Fish Division.

6. *ATTACHMENTS*

ATTACHMENT A: VICINITY MAPS

ATTACHMENT A.1: PROJECT VICINITY MAP



Jordan Cove Energy Project

Fish Passage Plan

Project Location

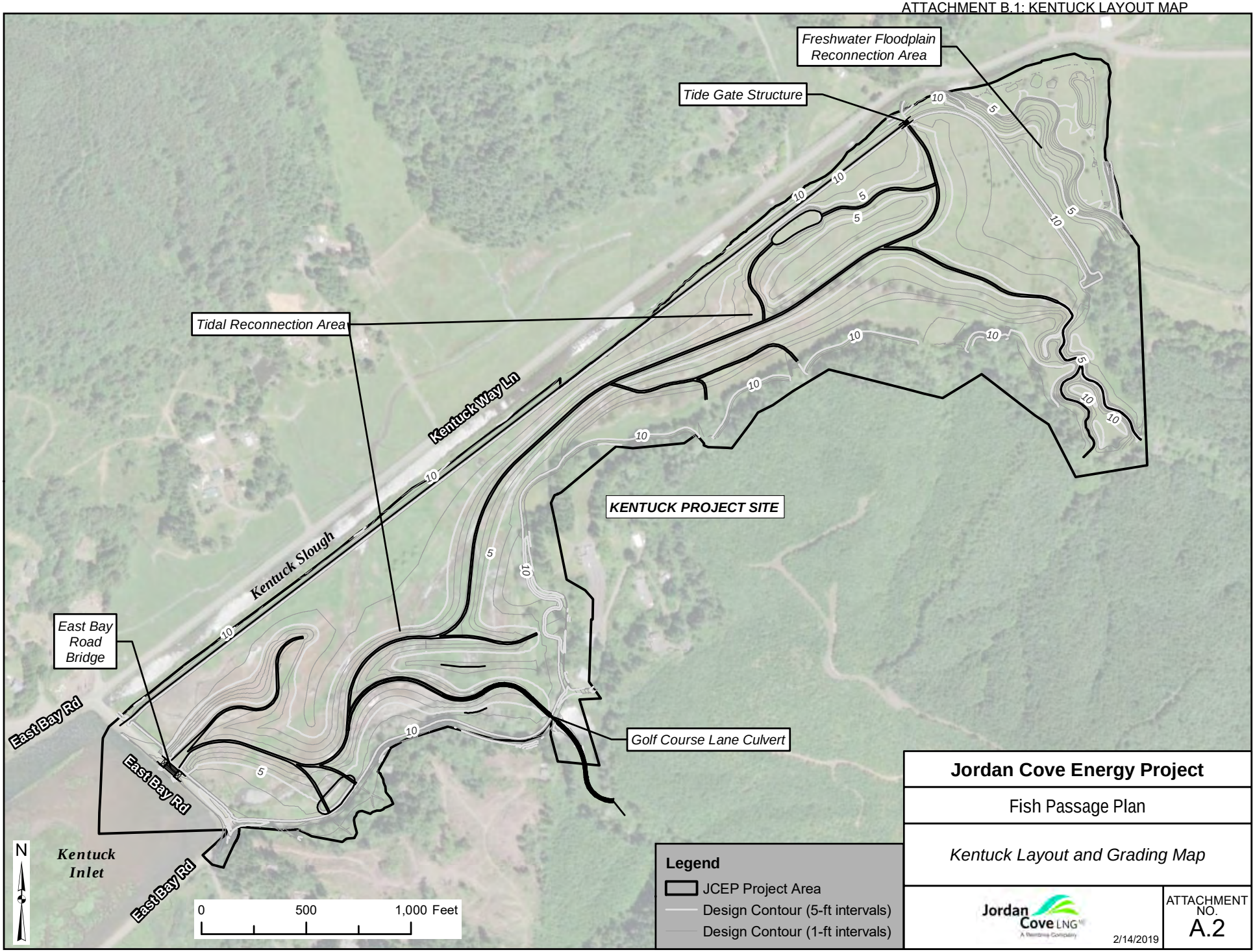
Jordan Cove LNG
A Fluor Company

2/14/2019

ATTACHMENT NO. A.1

\\deainc.com\files\PROJECT\JJLNG00000001\0600INFO\GS\Maps\ODFW Fish Passage\Attachment A.1-1 Overall Vicinity.mxd

ATTACHMENT A.2: KENTUCK LAYOUT MAP



Jordan Cove Energy Project

Fish Passage Plan

Kentuck Layout and Grading Map

Jordan Cove LNG

2/14/2019

ATTACHMENT NO. A.2

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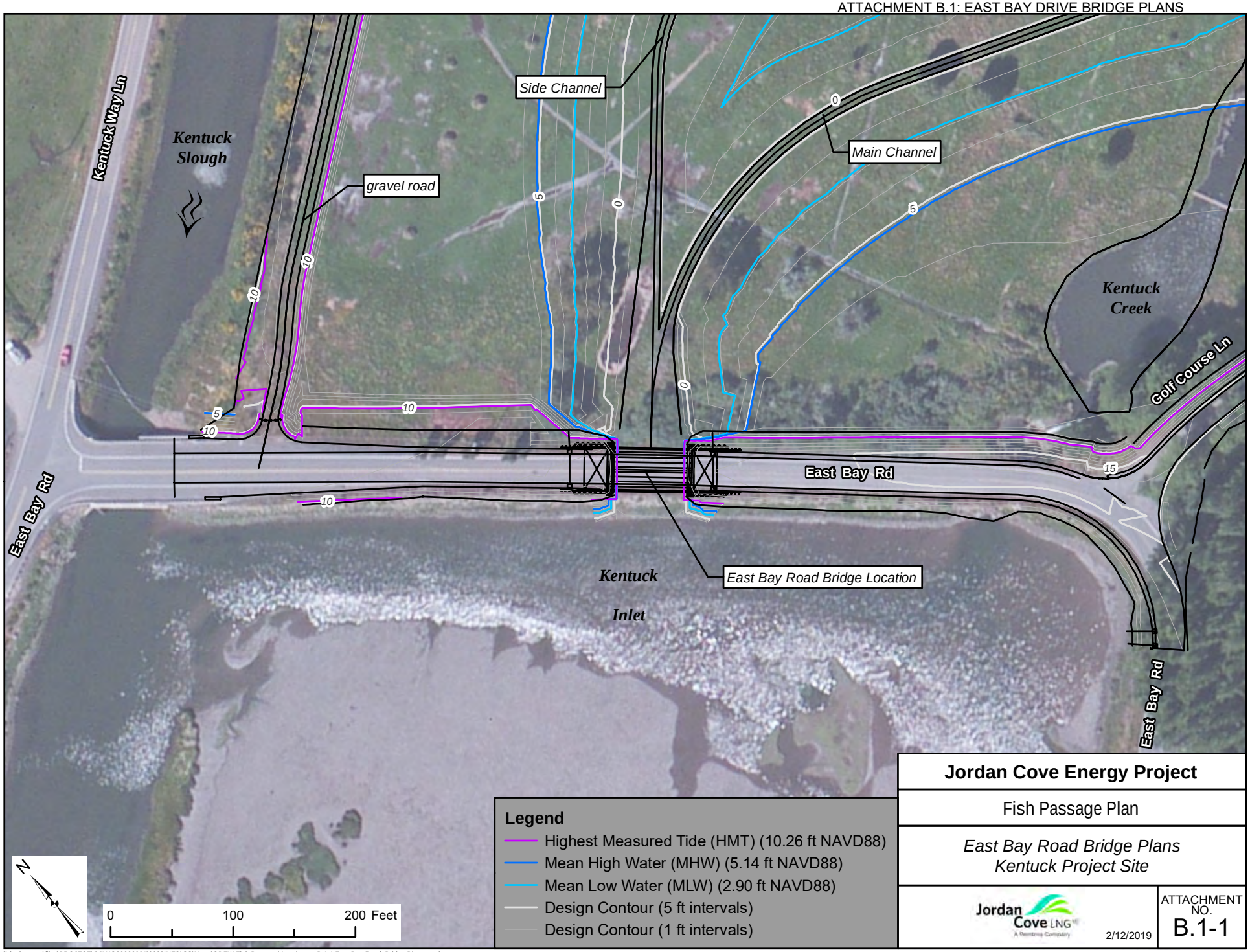
ATTACHMENT B: DESIGN PLANS

ATTACHMENT B.1: EAST BAY DRIVE BRIDGE PLANS



Jordan Cove Energy Project

Fish Passage Plan

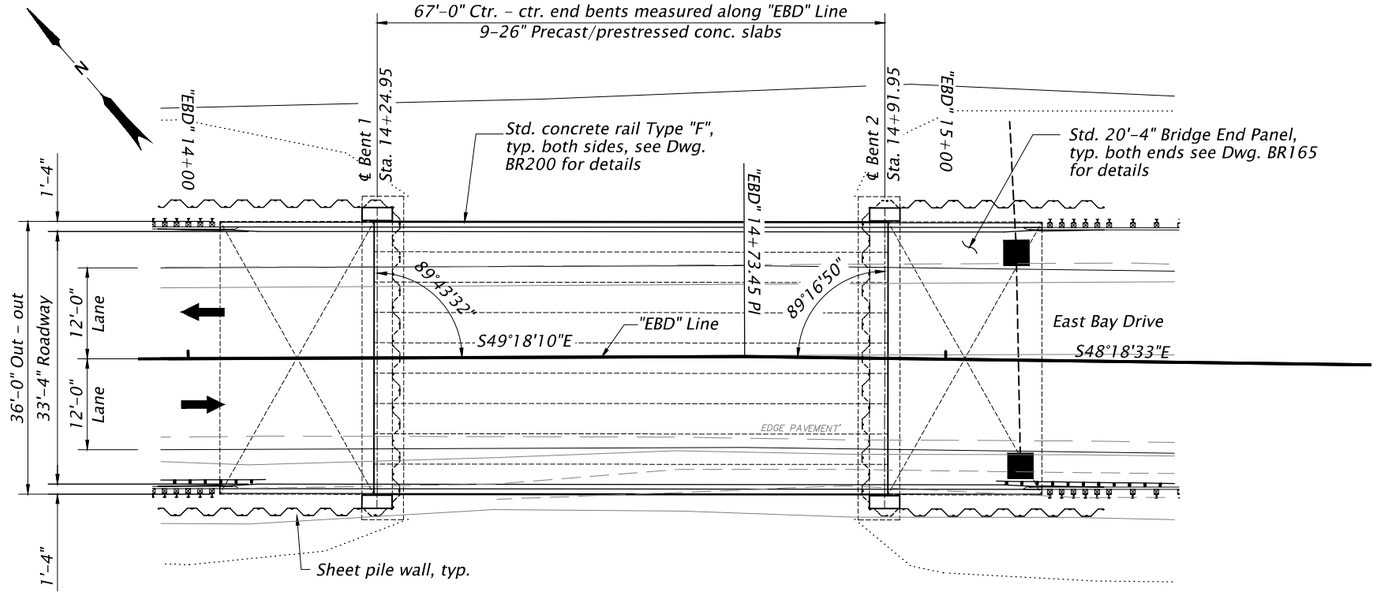
East Bay Road Bridge Plans
Kentuck Project Site

Jordan Cove LNG
A Pembina Company

2/12/2019

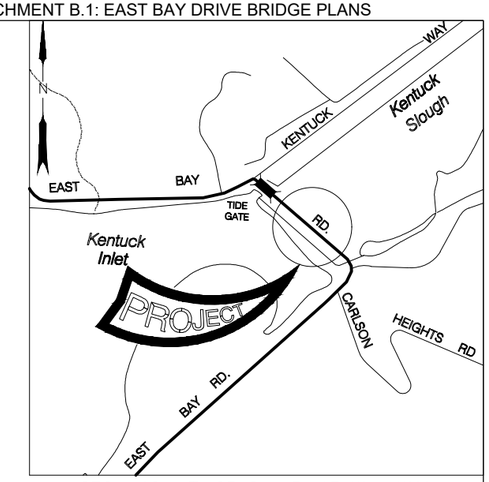
ATTACHMENT NO. B.1-1

\\deainc.com\files\PROJECT\JJLNG00000001\0600INFO\GS\Maps\ODFW Fish Passage\Attachment B.1-1 East Bay Road Bridge Plans.mxd



PLAN

Scale: 1" = 10'-0"



SEC. 12, T. 25 S., R. 13 W., W.M.

LOCATION MAP

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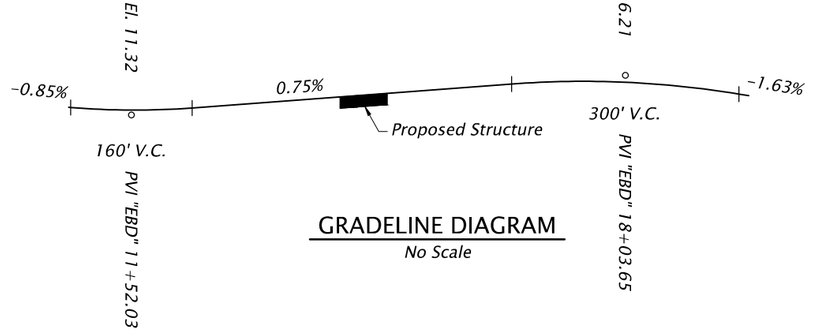

GRADELINE DIAGRAM

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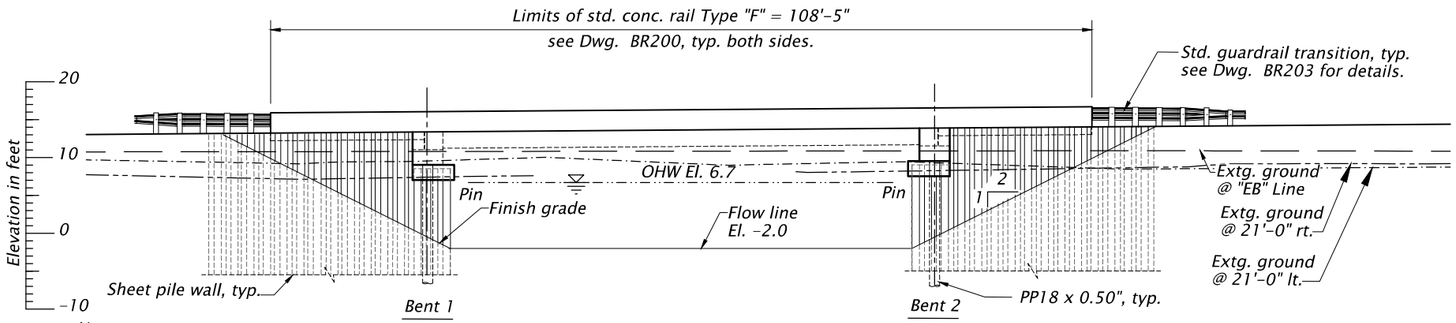


Note:
Elevations shown are based on North American Vertical Datum, 1988.
(MLLW Elev. 0.0 = NAVD88 Elev. -0.97)

ELEVATION

Scale: 1" = 10'-0"

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
1	12/07/18	JC		TS	REV A: ISSUED FOR REVIEW

DOC. CONTROL NO.: J1-600-STR-PLN-DEA-00001-01 Rev A - ISSUED FOR REVIEW

70% PLANS FOR REVIEW ONLY

DAVID EVANS AND ASSOCIATES INC.
2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
EAST BAY ROAD BRIDGE
COOS COUNTY

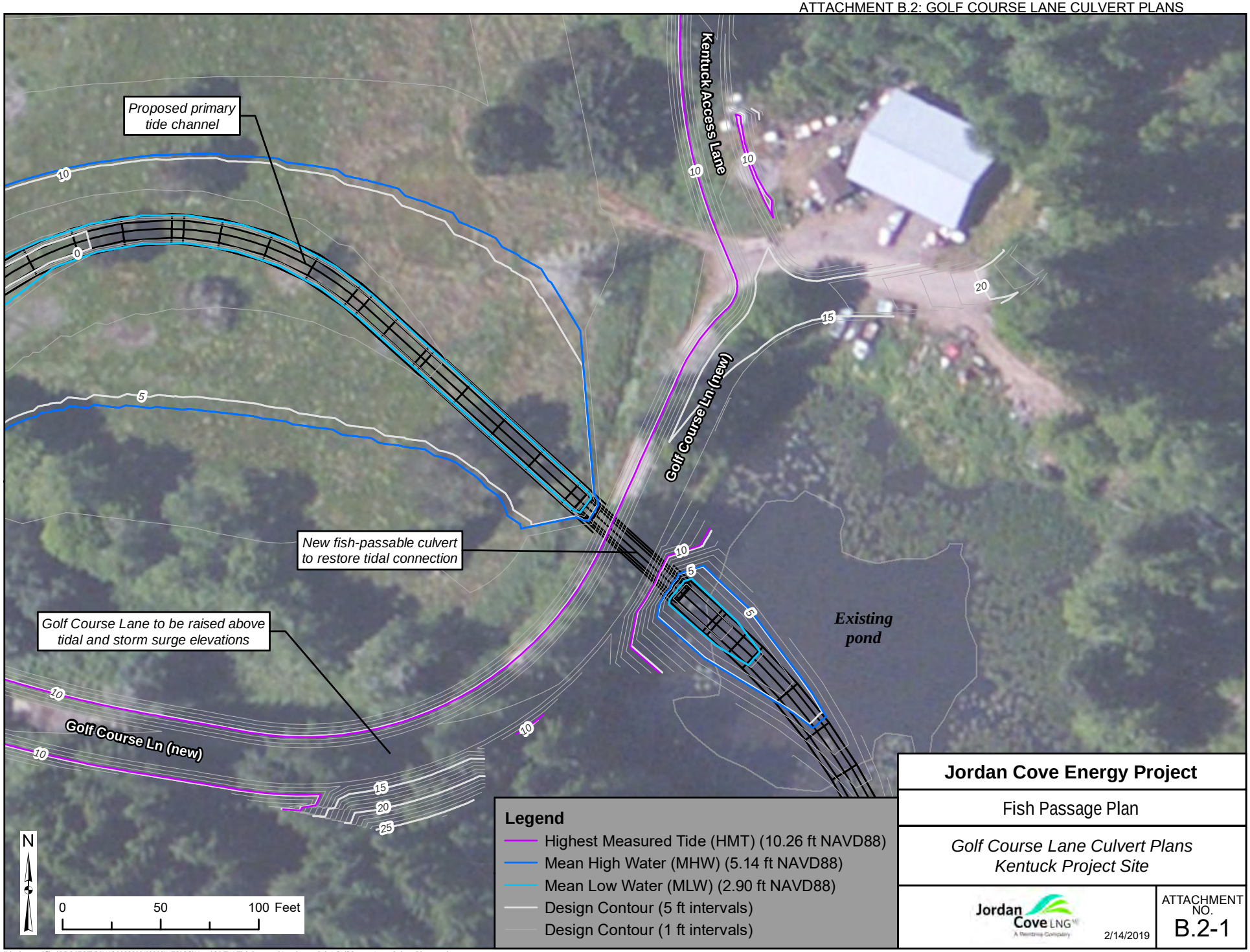
Designer: Anthony Calcagno
Drafter: Jim Culpepper
Review:
Checker: Terry Stones

Attachment B.1-2

PLAN AND ELEVATION

SHEET NO. S101

ATTACHMENT B.2: GOLF COURSE LANE CULVERT PLANS



Jordan Cove Energy Project

Fish Passage Plan

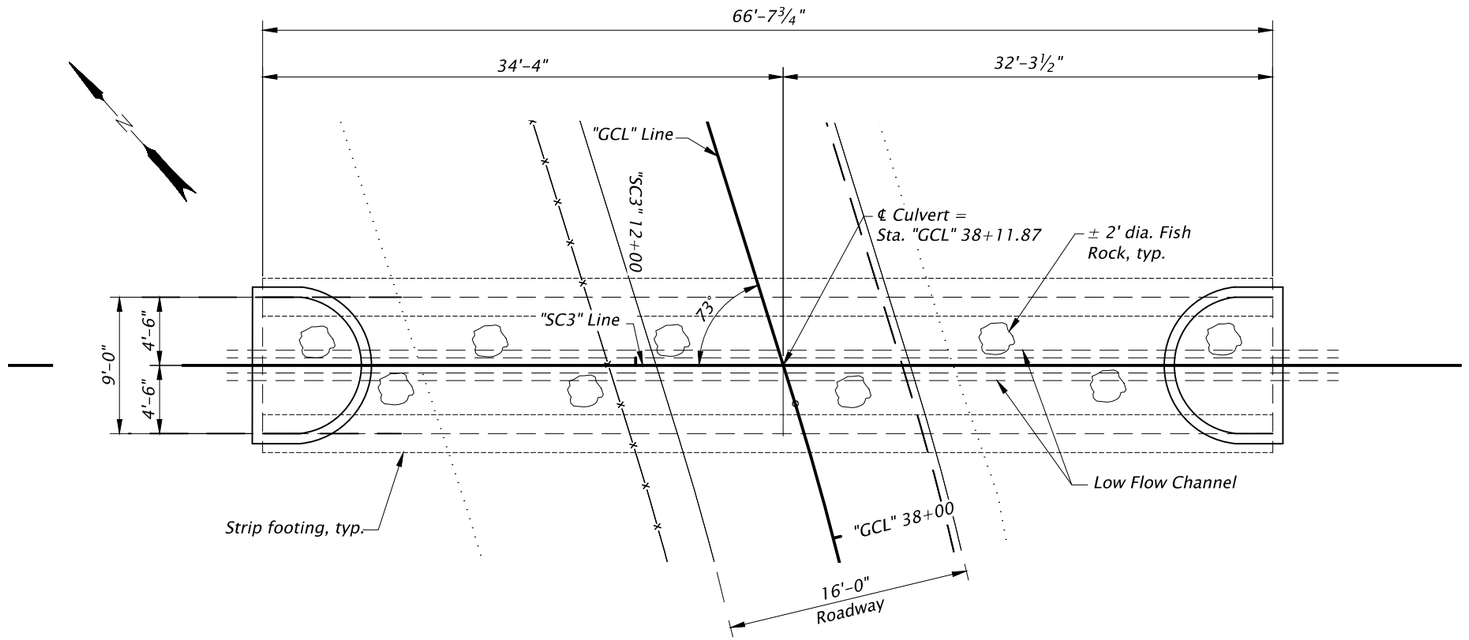
Golf Course Lane Culvert Plans
Kentuck Project Site

Jordan Cove LNG
A Pembina Company

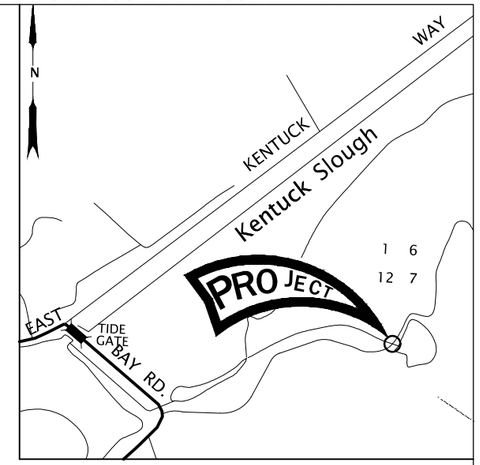
2/14/2019

ATTACHMENT NO. B.2-1

\\deainc.com\files\PROJECT\JJLNG00000001\0600INFO\GS\Maps\ODFW Fish Passage\Attachment B.2-1 Golf Course Lane Culvert Plans.mxd

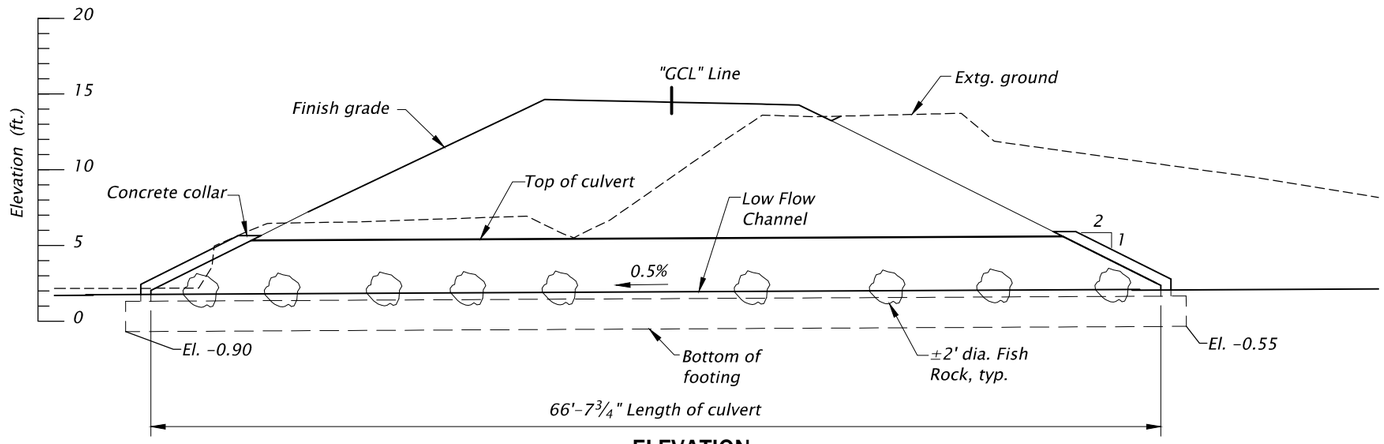


PLAN
Scale: 1" = 10'-0"



SEC. 1, T. 25 S., R. 13 W., W.M.

LOCATION MAP
No Scale



ELEVATION
Scale: 1" = 10'-0"

Note:
Elevations shown are based on North American Vertical Datum, 1988. (MLLW Elev. 0.0 = NAVD88 Elev. -0.97)

NO.	DATE	BY	CHK.	APPD.	REVISION AND RECORD OF ISSUE
1	12/07/18	JC		TS	REV A: ISSUED FOR REVIEW

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2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG

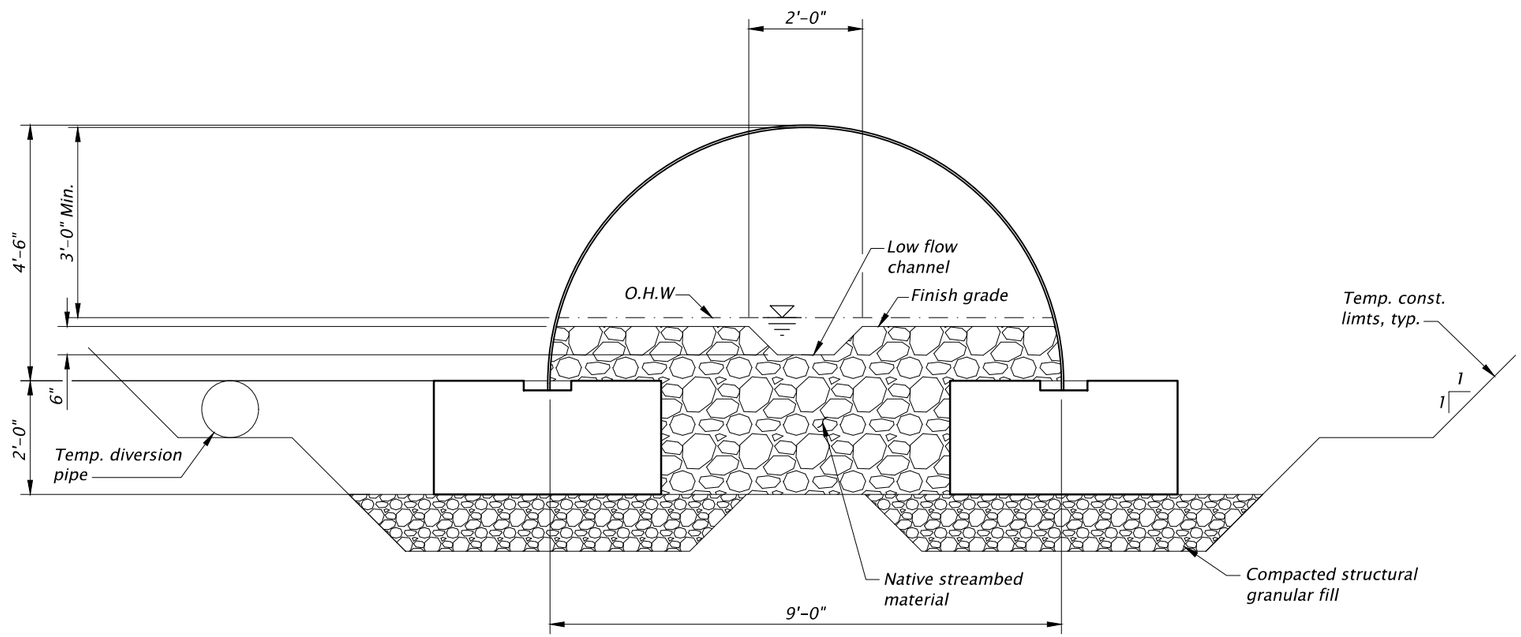
JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
GOLF COURSE LANE CULVERT
COOS COUNTY

Designer: Anthony Calcagno Review: Terry Stones
Drafter: Jim Culpepper Checker: -

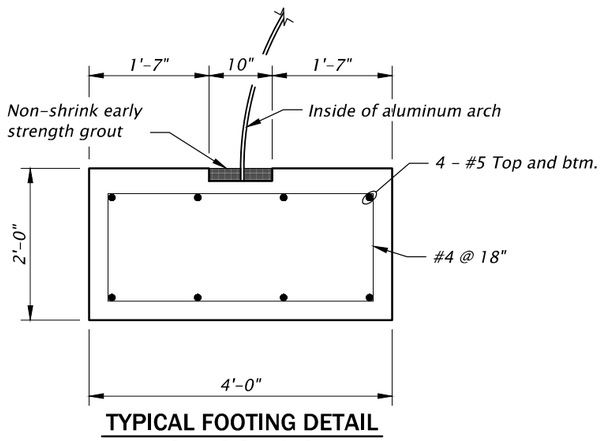
Attachment B.2-2

PLAN AND ELEVATION

SHEET NO. S301



TYPICAL SECTION
Scale: 3/8" = 1'-0"



TYPICAL FOOTING DETAIL
Scale: 1/2" = 1'-0"

GENERAL NOTES

Provide all materials and perform all work according to the 2018 Oregon Standard Specifications for Construction.

Design culvert in accordance with the 2017 AASHTO LRFD Bridge Design Specifications (including interim revisions) and the 2018 ODOT Bridge Design Manual (BDM).

During construction contractor is responsible for the safety of the structure.

Provide all reinforcing steel according to ASTM Specification A706, or AASHTO 31 (ASTM A615) Grade 60. Provide field bent stirrups according to ASTM Specification A706. Use the following splice lengths (unless shown otherwise).

Reinforcing Splice Lengths (Class B) Grade 60 f'c = 3.3 ksi											
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14	#18
Uncoated	1'-4"	1'-7"	2'-0"	2'-5"	2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	Not Permitted	

Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12" of fresh concrete is cast below the bar.

Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible,
unless shown otherwise.

All reinforcing shall have 2" of concrete cover unless shown otherwise.

All reinforcing spacing is intended to be maximum unless shown otherwise.

Provide a ¾" chamfer on all exposed concrete edges unless noted otherwise.

Provide all aluminum according to AASHTO M-219.

Provide Class 3000 - 1½", 1", or ¾" concrete for all other concrete.

All Grout shall be non-shrink high early strength grout (non-ferous) with a minimum strength of 5000 psi.

Low flow channel to have 1:1 side slopes.

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Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG℠

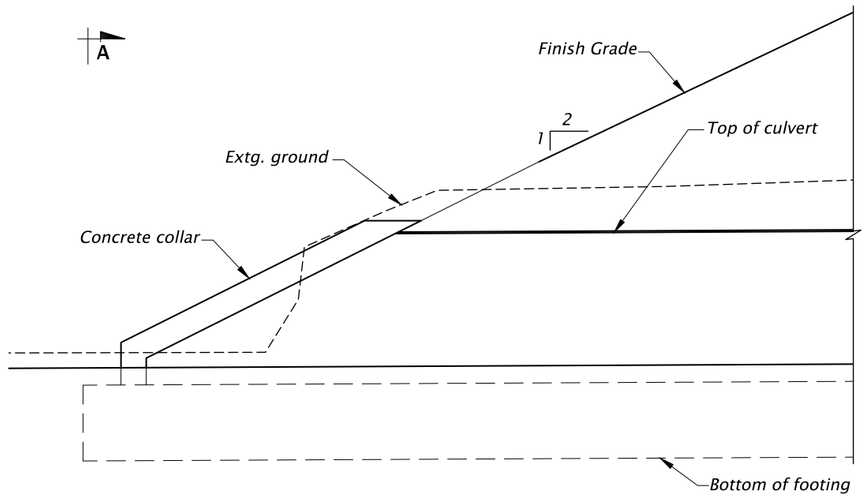
JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
GOLF COURSE LANE CULVERT
COOS COUNTY

Designer: Anthony Calcagno | Review: Terry Stones | Drafter: | Checker: -

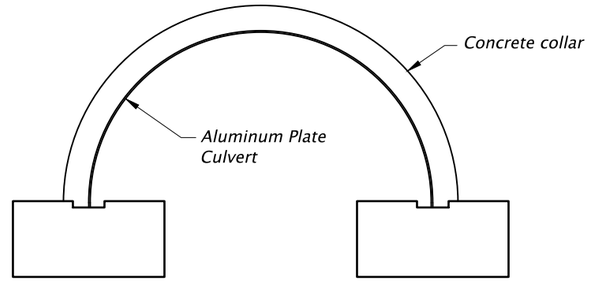
Attachment B.2-3

TYPICAL SECTION

SHEET NO. S302



CULVERT END DETAIL
Scale: 1/4" = 1'-0"



VIEW A-A
Scale: 1/4" = 1'-0"

NO.	DATE	BY	CHK.	APPD.	REVISION AND RECORD OF ISSUE
1	12/07/18	JC		TS	REV A: ISSUED FOR REVIEW

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2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

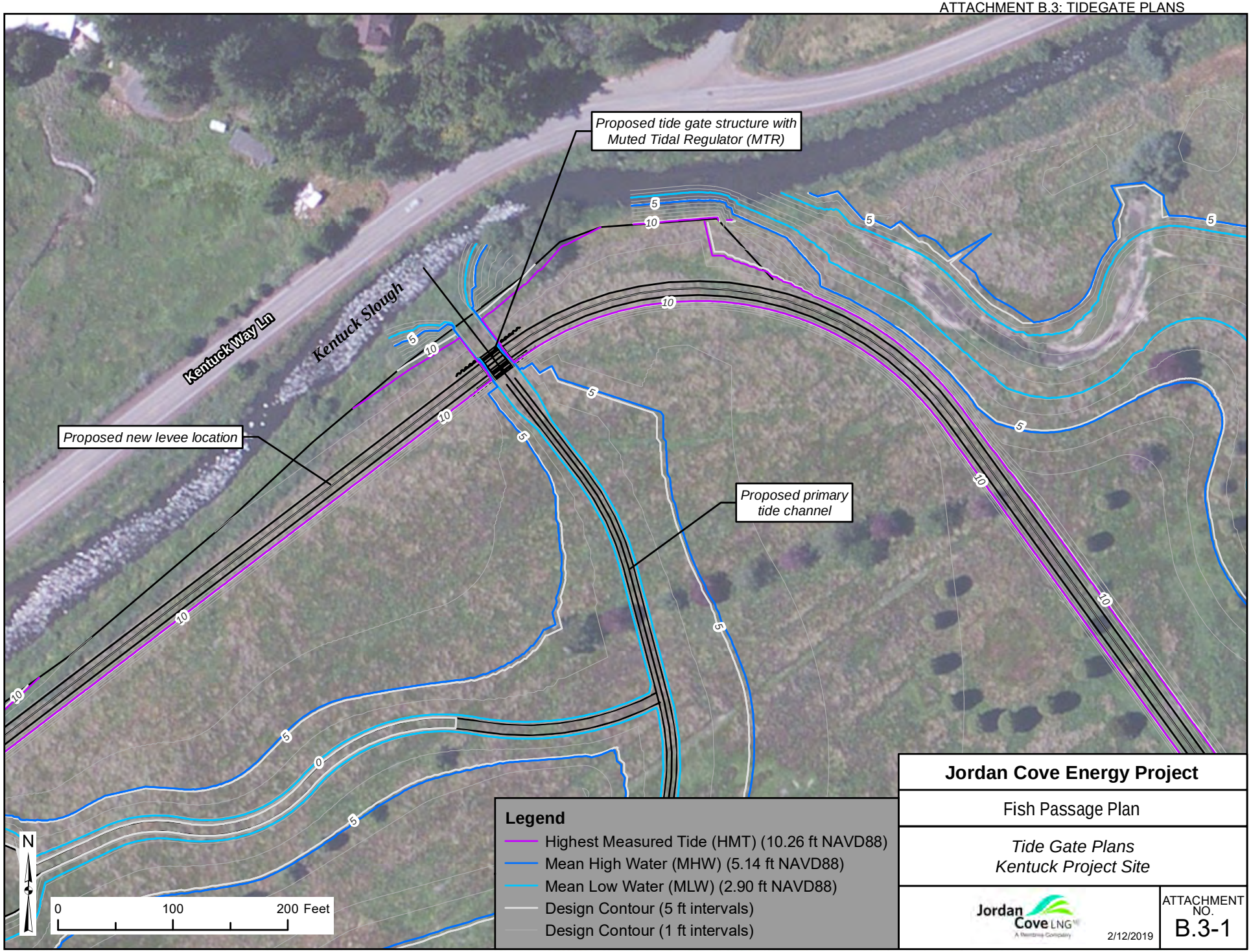
Jordan Cove LNG℠

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
GOLF COURSE LANE
COOS COUNTY

Designer: Anthony Calcagno | Review: Terry Stones | Attachment B.2-4
Drafter: Dusty Altenburg | Checker: -

HEADWALL DETAILS | SHEET NO. S303

ATTACHMENT B.3: TIDEGATE PLANS



Jordan Cove Energy Project

Fish Passage Plan

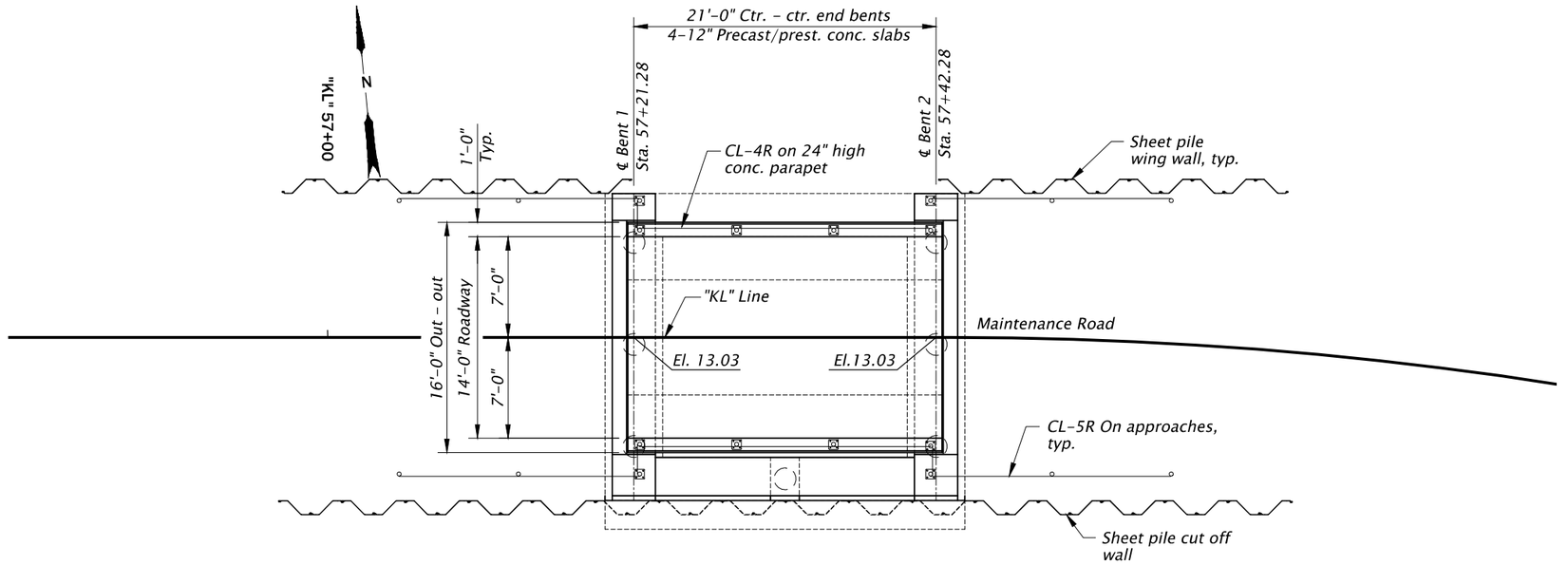
Tide Gate Plans
Kentuck Project Site

Jordan Cove LNG
A Pembina Company

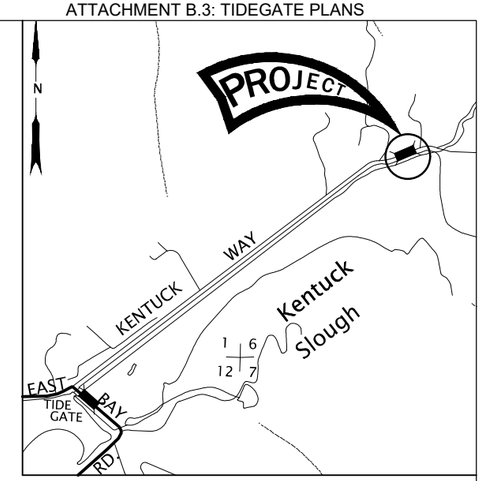
2/12/2019

ATTACHMENT NO. B.3-1

\\deainc.com\files\PROJECT\J\JLNG00000001\0600INFO\GS\Maps\ODFW Fish Passage\Attachment B.3-1 Tide Gate Plans.mxd

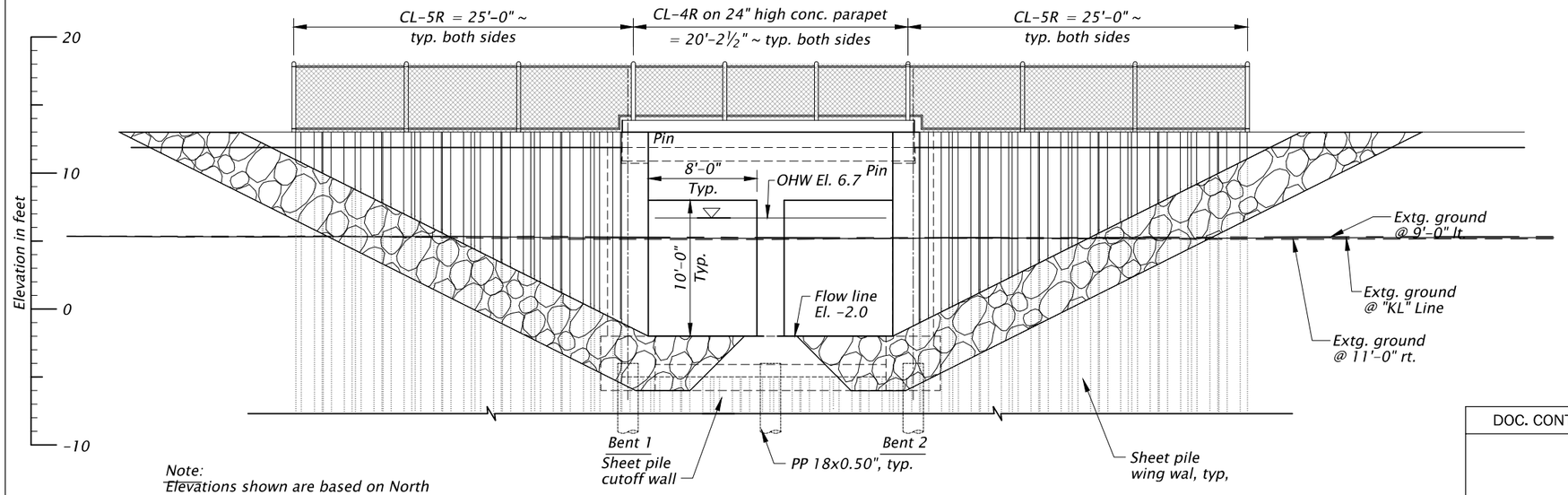


PLAN
Scale: 1" = 10'-0"



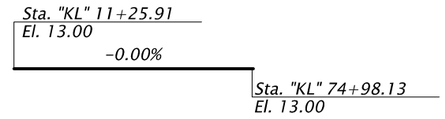
SEC. 1, T. 25 S., R. 13 W., W.M.

LOCATION MAP
No Scale



Note:
Elevations shown are based on North American Vertical Datum, 1988. To convert to MLLW Datum add 0.97 ft.

ELEVATION
Scale: 1" = 10'-0"



Note:
Gradeline is top of aggregate wearing surface at centerline maintenance road.

GRADELINE DIAGRAM
No Scale

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Jordan Cove LNG

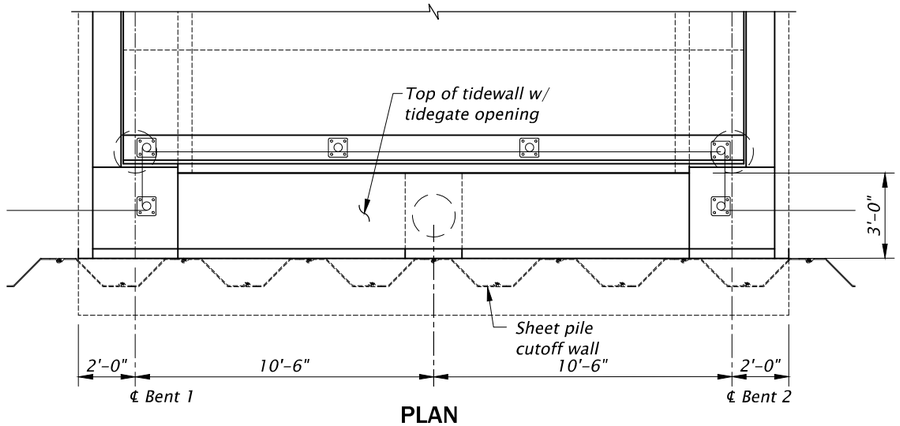
JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
KENTUCK MTR BRIDGE
COOS COUNTY

Designer: Anthony Calcagno | Review:
Drafter: Jim Culpepper | Checker: -

Attachment B.3-2

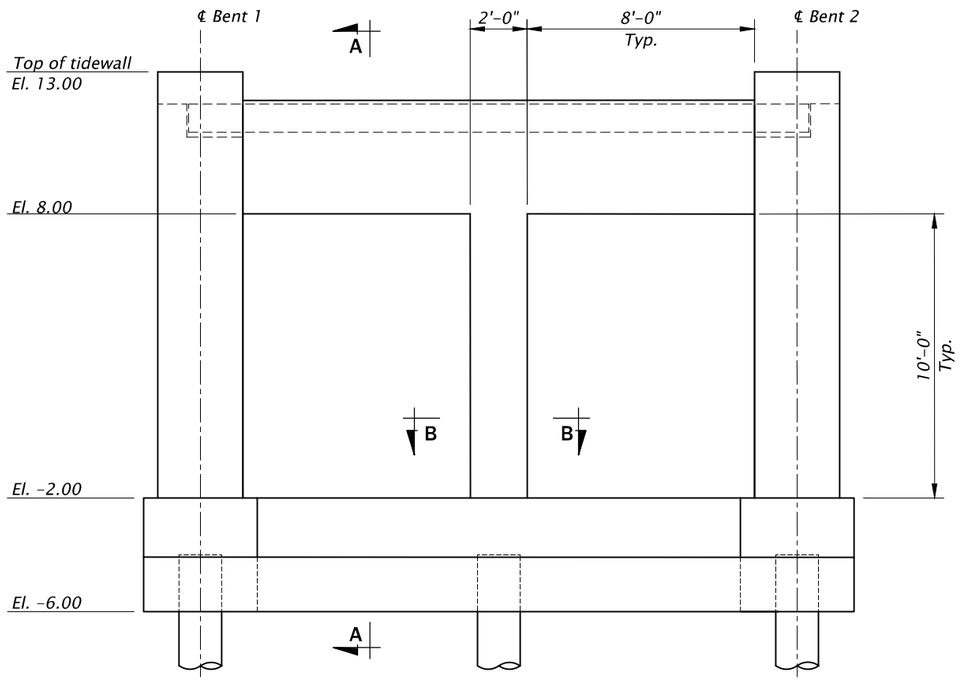
PLAN AND ELEVATION

SHEET NO. S201



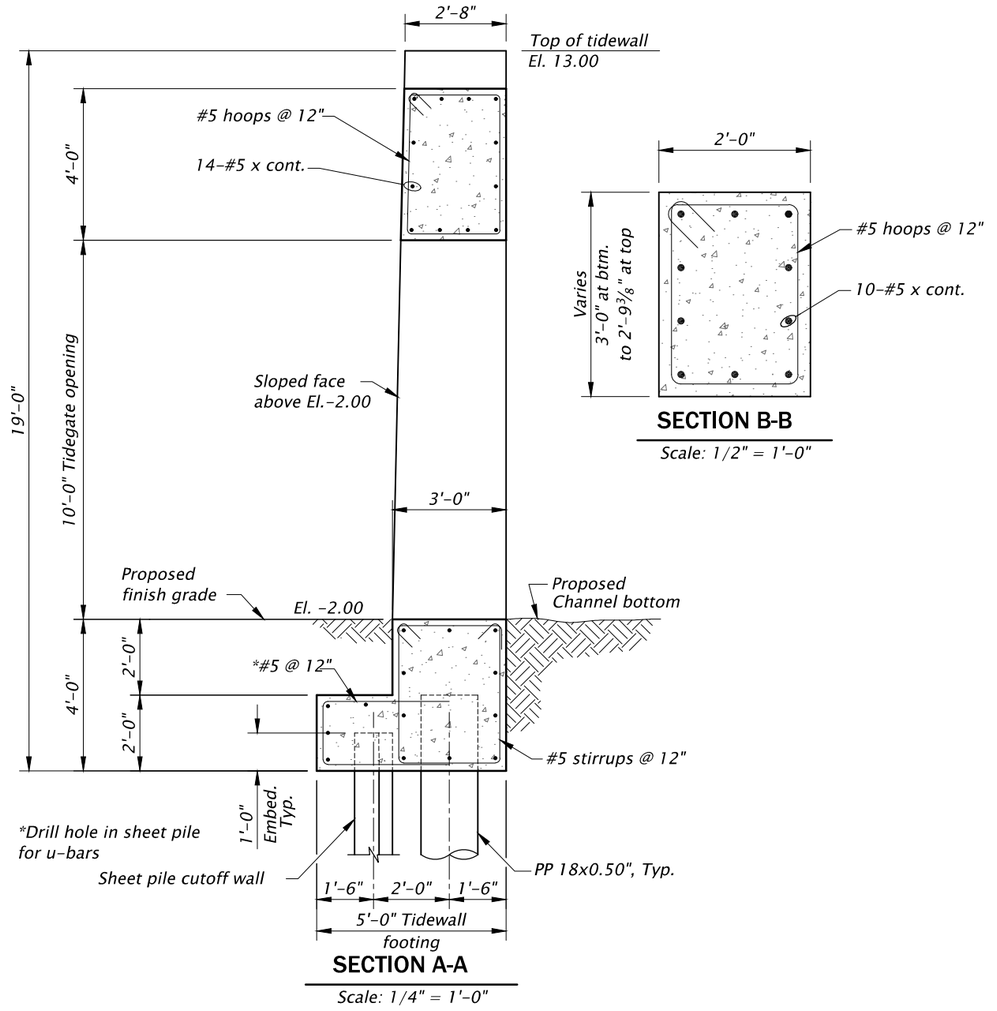
PLAN

Scale: 3/16" = 1'-0"



ELEVATION

Scale: 3/16" = 1'-0"



SECTION A-A

Scale: 1/4" = 1'-0"

SECTION B-B

Scale: 1/2" = 1'-0"

NO.	DATE	BY	CHK.	APPD.	REVISION AND RECORD OF ISSUE
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2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

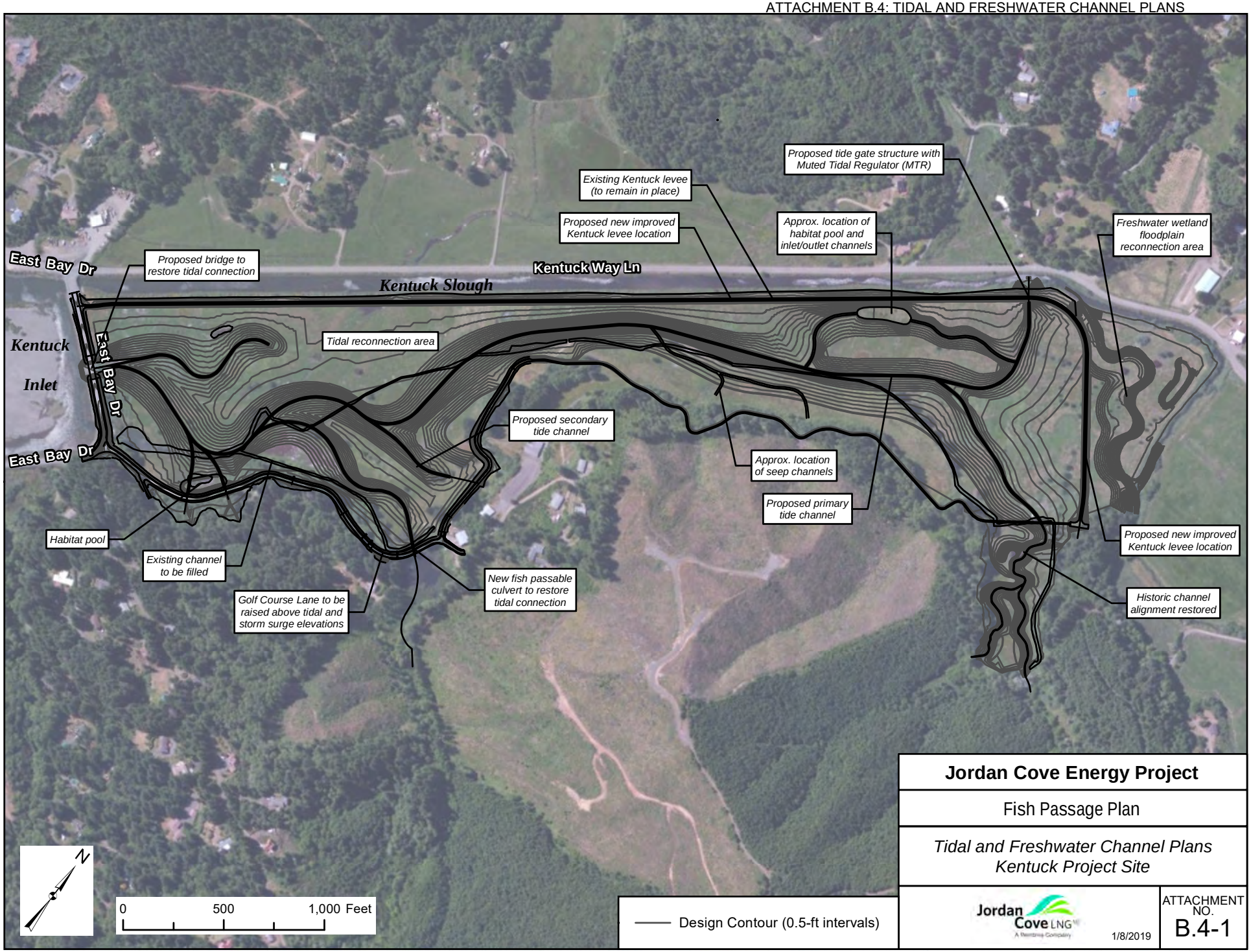
Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
KENTUCK MTR BRIDGE
COOS COUNTY

Designer: Anthony Calcagno | Review: Terry Stones | Attachment B.3-3
Drafter: Jim Culpepper | Checker: -

TIDE GATE FRAME | SHEET NO. S208

ATTACHMENT B.4: TIDAL AND FRESHWATER CHANNEL PLANS



Jordan Cove Energy Project

Fish Passage Plan

Tidal and Freshwater Channel Plans
Kentuck Project Site

Jordan Cove LNG
A Pembina Company

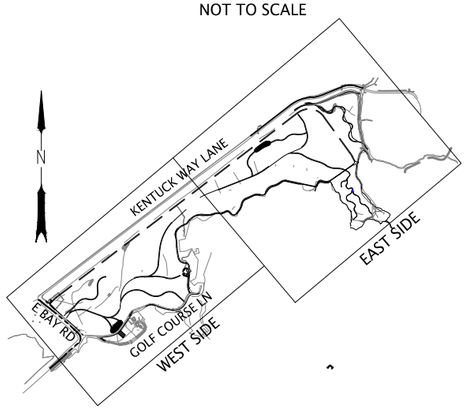
1/8/2019

ATTACHMENT NO. B.4-1

\\deainc.com\files\PROJECT\J\JLNG00000001\0600INFO\GS\Maps\ODFW Fish Passage\Attachment B.4-1 Tidal and Freshwater Channel Plans.mxd

SITE AND KEY MAP

NOT TO SCALE



VICINITY MAP

NOT TO SCALE

T.25S, R.12W, Sec. 6, 7;
T.25S, R.13W, Sec. 1, 12 W.M.

PROJECT LOCATION:

Located east of North Bend, Oregon (Township 25 South, Range 12 West, Sections 6 and 7; Township 25 South, Range 13 West, Sections 1 and 12, Willamette Meridian).

Latitude: 43.426073
Longitude: -124.180924

PROPERTY DESCRIPTION:

The Kentuck Project site is located east of North Bend, Oregon (Township 25 South, Range 12 West, Sections 6 and 7; Township 25 South, Range 13 West, Sections 1 and 12, Willamette Meridian). Tax maps and lots are: 25s12w06c lot 100, 25s13w12a lot 100, and 25s13w1d lot 400.

ATTENTION EXCAVATORS:

Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of these rules from the center by calling 503-232-1987. If you have any questions about the rules, you may contact the center. You must notify the center at least two business days, before commencing an excavation. Call 503-246-6699.

The permittee is required to meet all the conditions of the 1200-C permit. This ESCP and general conditions have been developed to facilitate compliance with the 1200-C permit requirements. In cases of discrepancies or omissions, the 1200-C permit requirements supercede requirements in this plan. (Refer to State of Oregon DEQ 1200-C General Permit, NPDES Stormwater Discharge Permit.) Furthermore, this ESCP has been developed to meet the Federal Energy Regulatory Commission (FERC) Upland Erosion Control, Revegetation, and Maintenance Plan (May 2013 Version).

ESC PLAN FOR SITES OVER 5 ACRES

OWNER/DEVELOPER

Fort Chicago LNG II U.S. LLC/Jordan Cove LNG.
111 SW 5th Ave, Ste 1100
Portland, Oregon 97204
(971) 940-7814
Contact: Derik Vowels, Lead Environmental Advisor
Email: Dvowels@pembina.com

CIVIL ENGINEER

David Evans And Associates, Inc.
2100 SW River Parkway
Portland, Oregon 97201
(503) 499-0470
Contact: Brady Berry, PE
Email: brady.berry@deainc.com

NARRATIVE DESCRIPTIONS

EXISTING SITE CONDITIONS:

Located east of North Bend, Oregon, the project site historically provided estuarine habitats (i.e., salt marsh, mudflats, tide channels, and fringing freshwater wetlands) that were hydrologically connected to the Kentuck Slough and Coos Bay estuary systems. However, circa the 1920s, the Kentuck Project site was diked and converted to agricultural uses. Eventually the site was converted into an 18-hole golf course before reverting back to agricultural use (i.e., pasture) in 2009.

DEVELOPED CONDITIONS:

The mitigation concept involves restoration activities to return the Kentuck Project site to its natural potential, given existing on-site and off-site constraints that include local transportation systems, access to and protection of adjacent private property, and Kentuck Drainage District requirements. Mitigation activities will establish a combination of habitat types including tidal mudflat, salt marsh, and wetlands that will interact to provide a holistic coastal ecosystem, will result in an uplift in ecosystem functions, and are expected to be particularly beneficial to coho salmon recovery and support of Chinook salmon. Socio-cultural benefits will be incorporated into the site to the extent feasible. Proposed improvements consist of construction of a new bridge in East Bay Drive, removal or plugging of existing culverts, levee augmentation with MTR installation, construction of a fish-passage culvert/structure, habitat establishment, and installation of a publicly accessible trail.

INSPECTION FREQUENCY:

SITE CONDITION	MINIMUM FREQUENCY
1. Active period	Daily when stormwater runoff, including runoff from snow melt, is occurring. At least once every fourteen (14) calendar days regardless of whether stormwater runoff is occurring.
2. Prior to the site becoming inactive or in anticipation of site inaccessibility	Once to ensure that erosion and sediment control measures are in working order. Any necessary maintenance and repair must be made prior to leaving the site.
3. Inactive periods greater than fourteen (14) consecutive calendar days	Once every month.
4. Periods during which the site is inaccessible due to inclement weather	If practical, inspections must occur daily at a relevant and accessible discharge point or downstream location.
5. Periods during which discharge is unlikely due to frozen conditions	Monthly. Resume monitoring immediately upon melt, or when weather conditions make discharges likely.

**Hold a pre-construction meeting of project construction personnel that includes the inspector to discuss erosion and sediment control measures and construction limits. (Schedule A.8.c.i.(3), 1200-C General Permit)*
**All inspections must be made in accordance with DEQ 1200-C permit requirements.*
**Inspection logs must be kept in accordance with DEQ's 1200-C permit requirements.*
**Retain a copy of the ESCP and all revisions on site and make it available on request To DEQ, agent, or the local municipality. During inactive periods of greater than seven (7) consecutive calendar days, retain the ESCP at the construction site or at another location. (Schedule B.2.a, 1200-C General Permit)*

NATURE OF CONSTRUCTION ACTIVITY:

Erosion and sediment control measures installation, clearing activities, site prep for dredge material delivery	*10/2020-9/2021*
Mass grading, dewatering of dredge material, begin construction of permanent and temporary infrastructure improvements	*4/2022-4/2024*
Dewatering of dredge material, continued construction of infrastructure improvements	*7/2021-10/2022*
Final grading and habitat structures, final stabilization, channel connection	*4/2024-10/2024*

Total site area: 106 acres
Total disturbed area: 106 acres

SOIL CLASSIFICATIONS:

12 Coquille silt loam
(0-1% slopes, very poorly drained)
41 Nestucca silt loam
(0-3% slopes, somewhat poorly drained)

RECEIVING WATER BODIES:

Kentuck Slough
Kentuck Creek
Coos Bay Estuary

PERMITTEE'S SITE INSPECTOR:

Name: TBD
Company/Agency: --
Phone Number: --
Fax Number: --
E-Mail Address: --
Description Of Experience:
15 Years Experience In Construction Inspection, Certified CESCL in Oregon State.

SHEET INDEX

BMP MATRIX FOR CONSTRUCTION PHASES

Refer to DEQ Guidance Manual for a comprehensive list of available BMPs.

	PHASE 1 *see description	PHASE 2 *see description	PHASE 3 *see description	PHASE 4 *see description	PHASE 5 *see description	WET WEATHER (OCT 1 - MAY 31)
EROSION PREVENTION						
SOIL TACKIFIERS		X	X	X	X	X
TEMPORARY MULCH		X	X	X	X	X
PLASTIC SHEETING						X
SLOPE AND CHANNEL MATTING		X	X	X	X	
COMPOST BLANKET				X	X	X
PERMANENT SEEDING/PLANTING				X	X	
SEDIMENT CONTROL						
PERIMETER SEDIMENT CONTROL	**X	X	X	X		X
SEDIMENT FENCE (INTERIOR)		X	X	X		X
SEDIMENT BARRIERS		X	X	X		X
DIVERSION DIKES/SWALES	X	X	X	X		X
STOCKPILE MANAGEMENT		X	X	X		X
DUST CONTROL		X	X			
RUN OFF CONTROL						
CONSTRUCTION ENTRANCE	**X	X	X	X	X	X
PIPE SLOPE DRAIN	X	X	X	X		X
ENERGY DISSIPATERS	X	X	X	X		X
OUTLET PROTECTION	X	X	X	X		X
UNPAVED ROADS GRAVELED, OR OTHER BMP ON THE ROAD	X	X	X	X		X
CHECK DAMS		X	X	X	X	X
COIR LOGS				X	X	
POLLUTION PREVENTION						
CONCRETE TRUCK WASHOUT	X					
PROPER SIGNAGE	X	X	X	X	X	X
HAZ WASTE MGMT	X	X	X	X	X	X
SPILL KIT ON-SITE	X	X	X	X	X	X

*** Signifies BMP that will be installed prior to any ground disturbing activity.*
PHASES OF CONSTRUCTION:
** PHASE 1: Stripping & temp grading of site, construction of temp stream diversion, construction of E Bay Road and bridge*
** PHASE 2: Dewatering of dredge sands*
** PHASE 3: Mass grading and levee widening*
** PHASE 4: Site stabilization, Golf Course Lane construction, trail and boardwalk construction, removal of temp stream diversion*
** PHASE 5: Permanent seeding & planting*
** For details on construction phasing, See ESC Plan Phasing Notes on sht. C003.*

RATIONALE STATEMENT

A comprehensive list of available best management practices (BMP) options based on DEQ's guidance manual has been reviewed to complete this erosion and sediment control plan. Some of the above listed BMP's were not chosen because they were determined to not effectively manage erosion prevention and sediment control for this project based on specific site conditions, including soil conditions topographic constraints, accessibility to the site, and other related conditions, as the project progresses and there is a need to revise the ESC plan, an action plan will be submitted.

Initial

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

DOC. CONTROL NO.: J1-600-CIV-KEY-DEA-00001-01 Rev C - ISSUED FOR REVIEW

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2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Drafter: T. Danisch | Checker: -

Attachment B.4-2

ESCP COVER SHEET

SHEET NO. G004

PRE-CONSTRUCTION, CLEARING, AND DEMOLITION NOTES

1. *All base ESC measures (perimeter sediment control, construction entrances, inlet protection, etc.) must be in place, functional, and approved in an initial inspection, prior to commencement of construction activities.*
2. *Sediment barriers approved for use are shown in the standard details and drawings listed on sheet C003.*
3. *Sensitive resources including, but not limited to, trees, wetlands, and riparian protection areas shall be clearly delineated with orange construction fencing or chain link fencing in a manner that is clearly visible to anyone in the area. No activities are permitted to occur beyond the construction barrier.*
4. *Construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures including, but not limited to, street sweeping and vacuuming, may be required to insure that all paved areas are kept clean for the duration of the project.*
5. *Run-on and run-off controls shall be in place and functioning prior to beginning substantial construction activities. Run-on and run-off control measures are listed in the BMP matrix on sheet C001, and are shown in the standard details and drawings listed on sheet C003.*

STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES *(Refer to Oregon DEQ 1200-C General Permit, NPDES Stormwater Design Permit)*

1. *Hold a pre-construction meeting of project construction personnel that includes the inspector to discuss erosion and sediment control measures and construction limits. (Schedule A.8.c.i.(3))*
2. *All inspections must be made in accordance with DEQ 1200-C permit requirements. (Schedule A.12.b and Schedule B.1)*
3. *Inspection logs must be kept in accordance with DEQ's 1200-C permit requirements. (Schedule B.1.c and B.2)*
4. *Retain a copy of the ESCP and all revisions on site and make it available on request to DEQ, Agent, or the local municipality. During inactive periods of greater than seven (7) consecutive calendar days, the above records must be retained by the permit registrant but do not need to be at the construction site. (Schedule B.2.c)*
5. *All permit registrants must implement the ESCP. Failure to implement any of the control measures or practices described in the ESCP is a violation of the permit. (Schedule A 8.a)*
6. *The ESCP must be accurate and reflect site conditions. (Schedule A.12.c.i)*
7. *Submission of all ESCP revisions is not required. Submittal of the ESCP revisions is only under specific conditions. Submit all necessary revision to DEQ or Agent within 10 days. (Schedule A.12.c.iv. and v)*
8. *Phase clearing and grading to the maximum extent practical to prevent exposed inactive areas from becoming a source of erosion. (Schedule A.7.a.iii)*
9. *Identify, mark, and protect (by construction fencing or other means) critical riparian areas and vegetation including important trees and associated rooting zones, and vegetation areas to be preserved. Identify vegetative buffer zones between the site and sensitive areas (e.g., wetlands), and other areas to be preserved, especially in perimeter areas. (Schedule A.8.c.i.(1) and (2))*
10. *Preserve existing vegetation when practical and re-vegetate open areas. Re-vegetate open areas when practicable before and after grading or construction. Identify the type of vegetative seed mix used. (Schedule A.7.a.v)*
11. *Maintain and delineate any existing natural buffer within the 50-feet of waters of the state. (Schedule A.7.b.i.and (2(a)(b))*
12. *Install perimeter sediment control, including storm drain inlet protection as well as all sediment basins, traps, and barriers prior to land disturbance. (Schedule A.8.c.i.(5))*
13. *Control both peak flow rates and total stormwater volume, to minimize erosion at outlets and downstream channels and streambanks. (Schedule A.7.c)*
14. *Control sediment as needed along the site perimeter and at all operational internal storm drain inlets at all times during construction, both internally and at the site boundary. (Schedule A.7.d.i)*
15. *Establish concrete truck and other concrete equipment washout areas before beginning concrete work. (Schedule A.8.c.i.(6))*
16. *Apply temporary and/or permanent soil stabilization measures immediately on all disturbed areas as grading progresses. Temporary or permanent stabilizations measures are not required for areas that are intended to be left unvegetated, such as dirt access roads or utility pole pads.(Schedule A.8.c.ii.(3))*
17. *Establish material and waste storage areas, and other non-stormwater controls. (Schedule A.8.c.i.(7))*
18. *Prevent tracking of sediment onto public or private roads using BMPs such as: construction entrance, graveled (or paved) exits and parking areas, gravel all unpaved roads located onsite, or use an exit tire wash. These BMPs must be in place prior to land-disturbing activities. (Schedule A 7.d.ii and A.8.c.i(4))*
19. *When trucking saturated soils from the site, either use water-tight trucks or drain loads on site. (Schedule A.7.d.ii.(5))*
20. *Control prohibited discharges from leaving the construction site, i.e., concrete wash-out, wastewater from cleanout of stucco, paint and curing compounds. (Schedule A.6)*
21. *Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, fertilizer, pesticides and herbicides, paints, solvents, curing compounds and adhesives from construction operations. (Schedule A.7.e.i.(2))*
22. *Implement the following BMPs when applicable: written spill prevention and response procedures, employee training on spill prevention and proper disposal procedures, spill kits in all vehicles, regular maintenance schedule for vehicles and machinery, material delivery and storage controls, training and signage, and covered storage areas for waste and supplies. (Schedule A. 7.e.iii.)*
23. *Use water, soil-binding agent or other dust control technique as needed to avoid wind-blown soil. (Schedule A 7.a.iv)*
24. *The application rate of fertilizers used to reestablish vegetation must follow manufacturer's recommendations to minimize nutrient releases to surface waters. Exercise caution when using time-release fertilizers within any waterway riparian zone. (Schedule A.9.b.iii)*
25. *If an active treatment system (for example, electro-coagulation, flocculation, filtration, etc.) for sediment or other pollutant removal is employed, submit an operation and maintenance plan (including system schematic, location of system, location of inlet, location of discharge, discharge dispersion device design, and a sampling plan and frequency) before operating the treatment system. Obtain plan approval before operating the treatment system. Operate and maintain the treatment system according to manufacturer's specifications. (Schedule A.9.d)*
26. *Temporarily stabilize soils at the end of the shift before holidays and weekends, if needed. The registrant is responsible for ensuring that soils are stable during rain events at all times of the year. (Schedule A 7.b)*
27. *As needed based on weather conditions, at the end of each workday soil stockpiles must be stabilized or covered, or other BMPs must be implemented to prevent discharges to surface waters or conveyance systems leading to surface waters. (Schedule A 7.e.ii.(2))*
28. *Construction activities must avoid or minimize excavation and bare ground activities during wet weather. (Schedule A.7.a.i)*
29. *Sediment fence: remove trapped sediment before it reaches one third of the above ground fence height and before fence removal. (Schedule A.9.c.i)*
30. *Other sediment barriers (such as biobags): remove sediment before it reaches two inches depth above ground height and before BMP removal. (Schedule A.9.c.i)*
31. *Catch basins: clean before retention capacity has been reduced by fifty percent. Sediment basins and sediment traps: remove trapped sediments before design capacity has been reduced by fifty percent and at completion of project. (Schedule A.9.c.iii& iv)*
32. *Within 24 hours, significant sediment that has left the construction site, must be remediated. Investigate the cause of the sediment release and implement steps to prevent a recurrence of the discharge within the same 24 hours. Any in-stream clean-up of sediment shall be performed according to the Oregon Department of State Lands required timeframe. (Schedule A.9.b.i)*
33. *The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments. (Schedule A.9.b.ii)*
34. *The entire site must be temporarily stabilized using vegetation or a heavy mulch layer, temporary seeding, or other method should all construction activities cease for 30 days or more. (Schedule A.7.f.i)*
35. *Provide temporary stabilization for that portion of the site where construction activities cease for 14 days or more with a covering of blown straw and a tackifier, loose straw, or an adequate covering of compost mulch until work resumes on that portion of the site. (Schedule A.7.f.ii)*
36. *Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. Once construction is complete and the site is stabilized, all temporary erosion controls and retained soils must be removed and disposed of properly, unless doing so conflicts with local requirements. (Schedule A.8.c.iii(1) and D.3.c.ii and iii)*

GRADING, STREET AND UTILITY EROSION AND SEDIMENT CONSTRUCTION NOTES

1. *Seed used for temporary or permanent seeding shall be composed of one of the following mixtures, unless otherwise authorized:*
   - *A. Permanently seeded areas require native seed mixes. Permanent seeding will be shown on the mitigation planting plans.*
   - *B. Standard temporary seeding mix (min. 100 lb./ac.)*
     1. *Annual Ryegrass (40% by weight)*
     2. *Creeping Red Fescue (60% by weight)*
2. *Slope to receive temporary or permanent seeding shall have the surface roughened by means of track-walking or the use of other approved implements. Surface roughening improves seed bedding and reduces run-off velocity.*
3. *Long term slope stabilization measures shall include the establishment of permanent vegetative cover via seeding with approved mix and application rate.*
4. *Temporary slope stabilization measures shall include: covering exposed soil with plastic sheeting, straw mulching, wood chips, or other approved measures.*
5. *Stockpiled soil or strippings shall be placed in a stable location and configuration. During "wet weather" periods, stockpiles shall be covered with plastic sheeting or straw mulch. Sediment fence is required around the perimeter of the stockpile.*
6. *Exposed cut or fill areas shall be stabilized through the use of temporary seeding and mulching, erosion control blankets or mats, mid-slope sediment fences or wattles, or other appropriate measures. Slopes exceeding 25% may require additional erosion control measures.*
7. *Areas subject to wind erosion shall use appropriate dust control measures including the application of a fine spray of water, plastic sheeting, straw mulching, or other approved measures.*
8. *Construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures including, but not limited to, tire washes, street sweeping, and vacuuming may be required to insure that all paved areas are kept clean for the duration of the project.*
9. *Active inlets to storm water systems shall be protected through the use of approved inlet protection measures. All inlet protection measures are to be regularly inspected and maintained as needed.*
10. *Saturated materials that are hauled off-site must be transported in water-tight trucks to eliminate spillage of sediment and sediment-laden water.*
11. *An area shall be provided for the washing out of concrete trucks in a location that does not provide run-off that can enter the storm water system. If the concrete wash-out area cannot be constructed greater than 50' from any discharge point, secondary measures such as berms or temporary settling pits may be required. The wash-out shall be located within six feet of truck access and be cleaned when it reaches 50% of the capacity.*
12. *Sweepings from exposed aggregate concrete shall not be transferred to the storm water system. Sweepings shall be picked up and disposed in the trash.*
13. *Avoid paving in wet weather when paving chemicals can run-off into the storm water system.*
14. *Use BMPs such as check-dams, berms, and inlet protection to prevent run-off from reaching discharge points.*
15. *Cover catch basins, manholes, and other discharge points when applying seal coat, tack coat, etc. to prevent introducing these materials to the storm water system.*

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2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-3
Drafter: T. Danisch | Checker: -

ESCP NOTES | SHEET NO. G005

ESC PLAN BMP LEGEND

- *Temporary Construction Fencing*
- *Construction Entrance*
- *Sediment Fence*
- *Concrete Truck Wash Out Facility*
- *Slope and Channel Matting*
- *Check Dam (compost filter sock)*

CWS STANDARD DETAILS

CWS Drawing No.

810 – Plastic sheeting
815 – Pipe slope drain
820 – Outlet protection, rip rap
830 – Surface roughening, cat tracking
850 – Diversion dike / swale
915 – Inlet protection, bio-filter bags
940 – Spacing tables

ODOT STANDARD DRAWINGS

RD0364 – Concrete inlets type G-1, G-2, G-2M, & G-2MA
RD0365 – Frames and grates for concrete inlets
RD1000 – Construction entrances
RD1005 – Aggregate, sandbag, and biofilter bag check dams
RD1006 – Wattle / fiber roll and compost filter sock check dams
RD1030 – Biofilter bag / sand bag sediment barrier and fiber roll sediment barrier
RD1032 – Compost filter sock sediment barrier
RD1033 – Compost filter berm series sediment barrier
RD1040 – Sediment fence
RD1055 – Slope and channel matting
RD1060 – Tire Wash
RD1070 – Concrete truck wash out facility

STANDARD DETAILS

DET6017 – Compost erosion blanket
Sediment barrier, coir log

Note:
Some of the BMPs in the Standard Details and Standard Drawings currently listed may not be shown on the ESC plans at this time. These BMPs will be available to the contractor for use during construction, specified in the final ESC design or required for Emergency and Wet Weather stockpiled materials.

ESC PLAN PHASING NOTES**

PHASE 1:
Construction activities include the reconstruction (raising the elevation) of E Bay Rd, construction of the new bridge at E Bay Rd, clearing and grubbing the site, performing temporary grading, and building the diversion dike and swale for the temporary stream diversion. Perimeter controls, including temporary construction fencing, construction entrances, perimeter sediment fence and inlet protection, will be installed prior to beginning construction. A temporary coffer dam, to be designed by the bridge engineers, will be installed between the E Bay Rd bridge and the bay, isolating the construction area from tidal influence. Fish will be removed and excluded from work area. The temporary coffer dam will be installed and removed during the approved ODFW in-water work window.

Topsoil throughout the site will be excavated, and stockpiled in the form of the temporary diversion berm.
All disturbed soils will be stabilized according to the requirements set out in the ESC notes and plans. Temporary pipe slope drains will be used to divert existing streams to undisturbed areas while the diversion dike and swale are under construction. The diversion swale will be stabilized with channel matting and check dams before existing streams are diverted to the swale, to ensure that flows will be clean and free of sedimentation by the time they leave the site through the existing culvert. The site is otherwise isolated by existing topography and perimeter controls, and construction activities will be fully contained.

PHASE 2:
Construction activities include construction and operation of the dredge sand de-watering facility, which will be located on the west end of the site. (The dredge sand de-watering facility is described in more detail on the Phase 2 Notes and Keynotes sheet, C122.)

Runoff from the dredge sand de-watering facility will be free of most sediment by the time it leaves the vicinity of the facility itself, but the flows will be directed, through an upturned pipe penetrating the diversion dike, into the temporary diversion swale at a point where the runoff must flow through several check dams before leaving the site. The intent is that this will remove any remaining fine particles from the dredge sands runoff, before the water exits the site through the existing culvert.

PHASE 3:
Construction activities consist of mass grading throughout the site, widening of the existing Kentuck Levee (on the interior side), relocation of the levee at the east end of the site, construction of the Muted Tidal Regulator (MTR) tide gate in the levee, and ongoing dredge sand de-watering. The relocation of the levee in the western portion of the site is proposed to create a freshwater mitigation area and restore historic channels of Kentuck Creek. Mass grading will occur as dredge sand becomes available for use from the de-watering facility. The Pacific Connector Gas Pipe (PCGP) line, which will run through the site underground, is anticipated to be installed during this phase, prior to completion of mass grading. When mass grading and de-watering are complete, the de-watering facility will be removed and the area will be graded according to the grading plan.

Disturbed soils will be stabilized with temporary mulch and seeding as required, while grading activities progress. Perimeter BMPs will be maintained, and installed in new areas as required. The diversion swale will be isolated from construction activities by the stabilized diversion dike, and it will continue to provide diversion for existing streams and treat sediment-laden water from the dredge sand de-watering facility. Fish will be removed and exluded from irrigation pond and excluded from work area. The top 12" of soil removed from the irrigation pond will be removed and disposed of per the contaminated soil plan.

PHASE 4:
Construction includes the regrading (raising) of Golf Course Ln, construction of the soft surface trail and boardwalk along the southern edge of the site, and stabilization of all graded areas. Permanent stream stabilization and bio-engineering features, including coir soil lifts and habitat structures, will be installed following mass grading. Streambed gravels will be placed in the bottom of the freshwater channel, northeast of the relocated dike. The diversion dike and swale will be removed in stages, as the new channels become sufficiently stabilized, with the help of proposed pipe slope drains throughout the process, and the coffer dam between E Bay Bridge and the bay will be removed. As the diversion dike and swale are removed, those areas will be graded according to the proposed grading plan, and those soils will be stabilized. Perimeter controls, including construction entrances, sediment fence, temporary construction fence and inlet protection, will remain in place until permanent stabilization is established.

PHASE 5:
This phase consists of permanent stabilization through mitigation planting.

***Phases described are the anticipated order of construction activities. The construction sequencing may be changed according to contractor "means and methods." However, all specified BMPs are required for corresponding construction activities as shown on the plans.*

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Jordan Cove LNG

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KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-4
Drafter: T. Danisch | Checker: -

ESCP LEGEND & DETAILS LIST | SHEET NO. G006

Kentuck Way Lane

Kentuck Slough

Existing Kentuck Slough bridge and MTR

Highest measured tide 10.26 NAVD 88

East Bay Road

Reference Marsh Area

TAX LOT 100

Existing culvert

Existing berm with culvert and tidegate

Golf Course Lane

Existing channel (fish to be removed and excluded prior to construction)

Kentuck Levee

TAX LOT 400

TAX LOT 100

Creek

Existing wetland

TAX LOT 101

MATCH LINE – SEE SHEET C101

TAX LOT 300

TAX LOT 500

TAX LOT 400

Existing culvert

Existing culvert

Existing culvert

Existing irrigation pond (fish to be removed and excluded prior to construction)

TAX LOT 200

TAX LOT 700

TAX LOT 500

Existing parking area

Kentuck Access Road

TAX LOT 900

TAX LOT 799

TAX LOT 798

TAX LOT 501

TAX LOT 600

LEGEND

- DELINEATED WETLAND
- ORDINARY HIGH WATER
- HIGHEST MEASURED TIDE
- PROPERTY LINE (TAX LOT BOUNDARIES)

NOTE:
ELEVATIONS BASED ON NAVD88 DATUM.
(MLLW Elev. 0.0 = NAVD88 Elev. -0.97)

N

0 100 200 400

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COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-5

Drafter: T. Danisch | Checker: -

EXISTING CONDITIONS-WEST SIDE | SHEET NO. C100

MATCH LINE – SEE SHEET C100

Kentuck Levee

Existing channel (fish to be removed and excluded prior to construction)

Creek

TAX LOT 100

Existing wetland

Kentuck Way Lane

Kentuck Slough

Existing 30" corrugated metal pipe flowing into Kentuck Slough

Existing 72" culvert flowing into Kentuck Slough

Mettman Crk Rd

Mettman Creek

No longer TAX LOT 400

Kentuck Creek

TAX LOT 601

TAX LOT 501

TAX LOT 400

N

0 100 200 400

LEGEND

- DELINEATED WETLAND
- ORDINARY HIGH WATER
- HIGHEST MEASURED TIDE
- PROPERTY LINE (TAX LOT BOUNDARIES)

NOTE:
ELEVATIONS BASED ON NAVD88 DATUM.
(MLLW Elev. 0.0 = NAVD88 Elev. -0.97)

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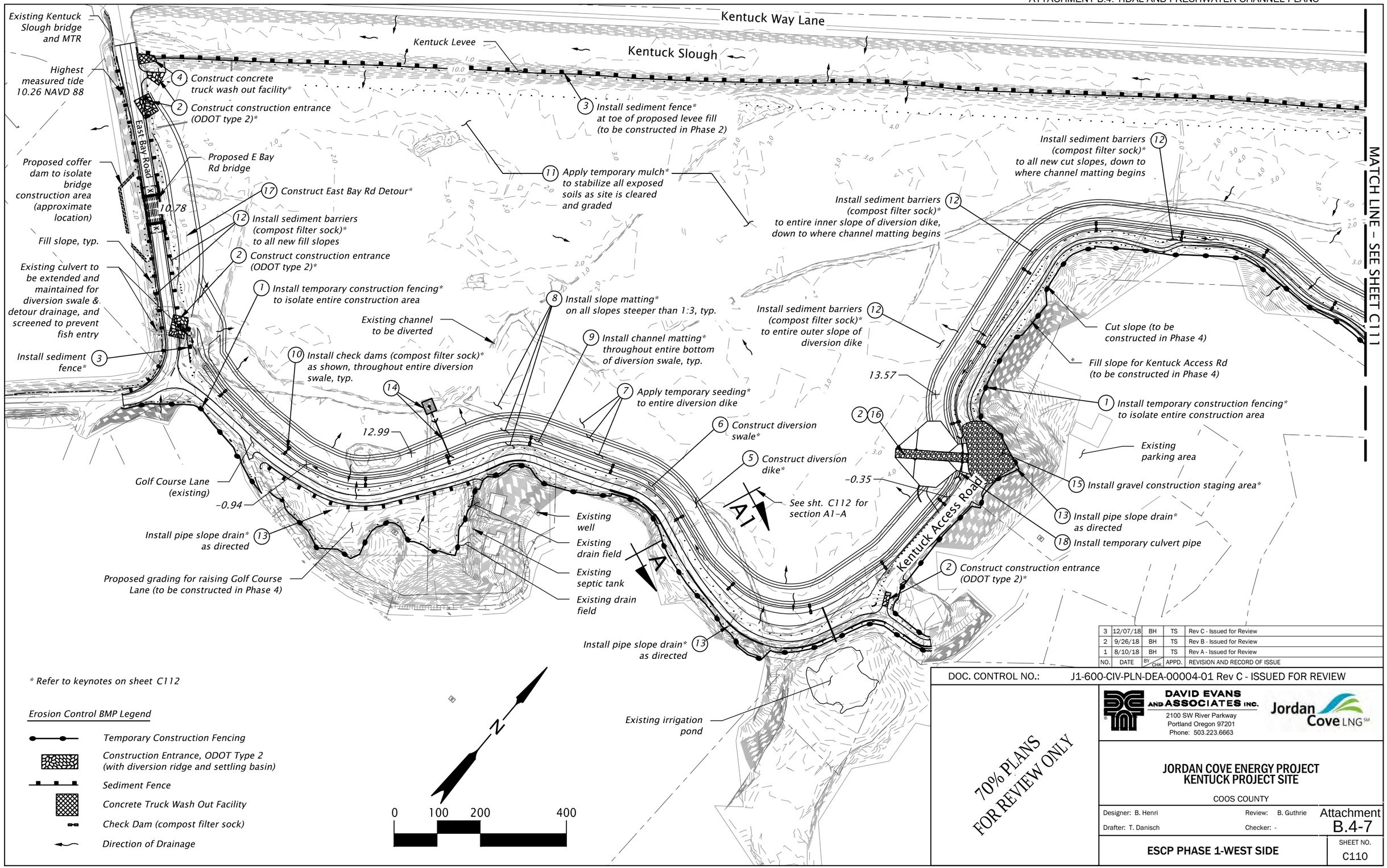
COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-6
Drafter: T. Danisch | Checker: -

EXISTING CONDITIONS-EAST SIDE | SHEET NO. C101



* Refer to keynotes on sheet C112

Erosion Control BMP Legend

- Temporary Construction Fencing
- Construction Entrance, ODOT Type 2 (with diversion ridge and settling basin)
- Sediment Fence
- Concrete Truck Wash Out Facility
- Check Dam (compost filter sock)
- Direction of Drainage

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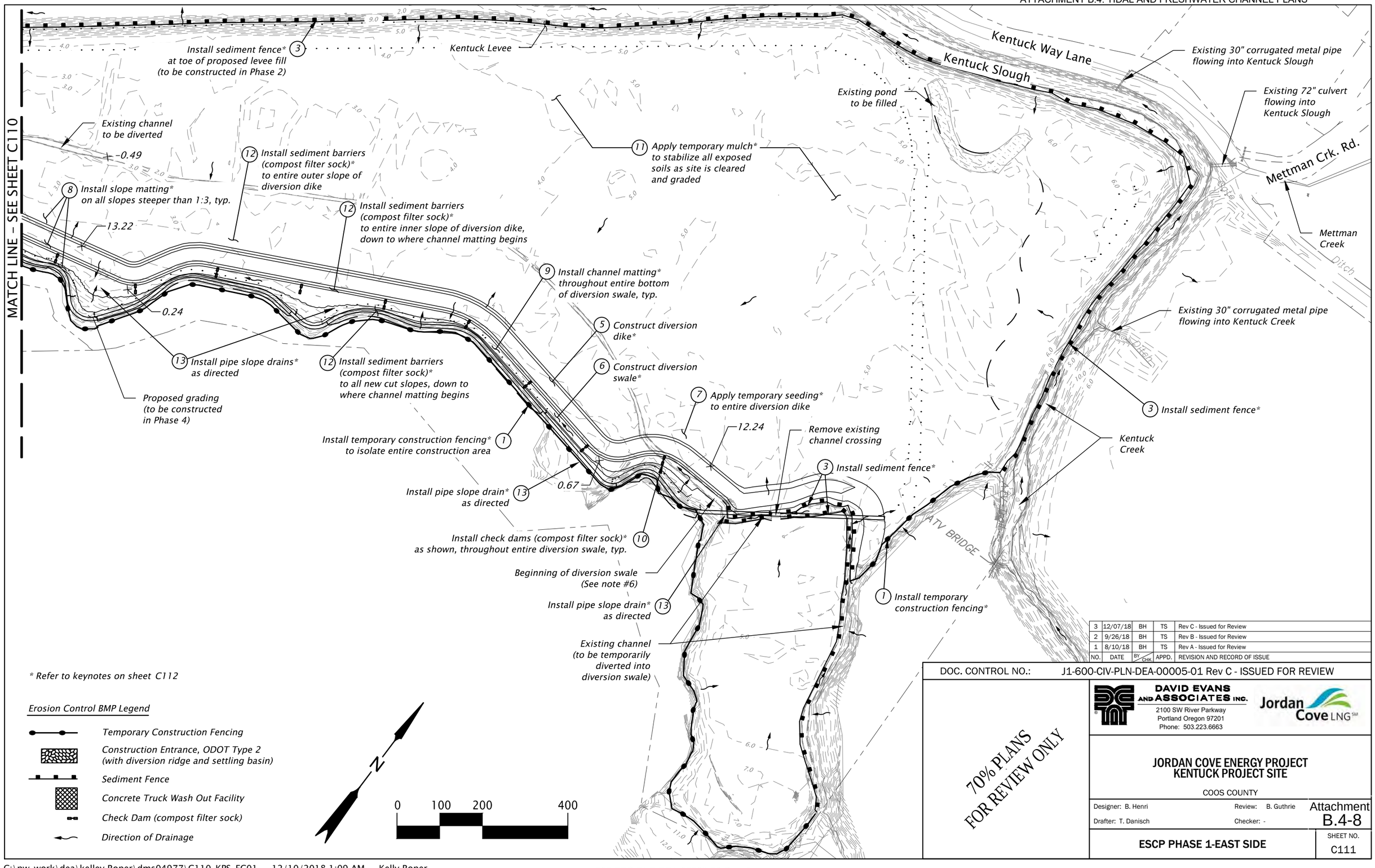
COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Drafter: T. Danisch | Checker: -

Attachment B.4-7

ESCP PHASE 1-WEST SIDE

SHEET NO. C110



* Refer to keynotes on sheet C112

Erosion Control BMP Legend

- Temporary Construction Fencing
- Construction Entrance, ODOT Type 2 (with diversion ridge and settling basin)
- Sediment Fence
- Concrete Truck Wash Out Facility
- Check Dam (compost filter sock)
- Direction of Drainage

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Attachment B.4-8

ESCP PHASE 1-EAST SIDE

SHEET NO. C111

Phase 1 Construction Notes

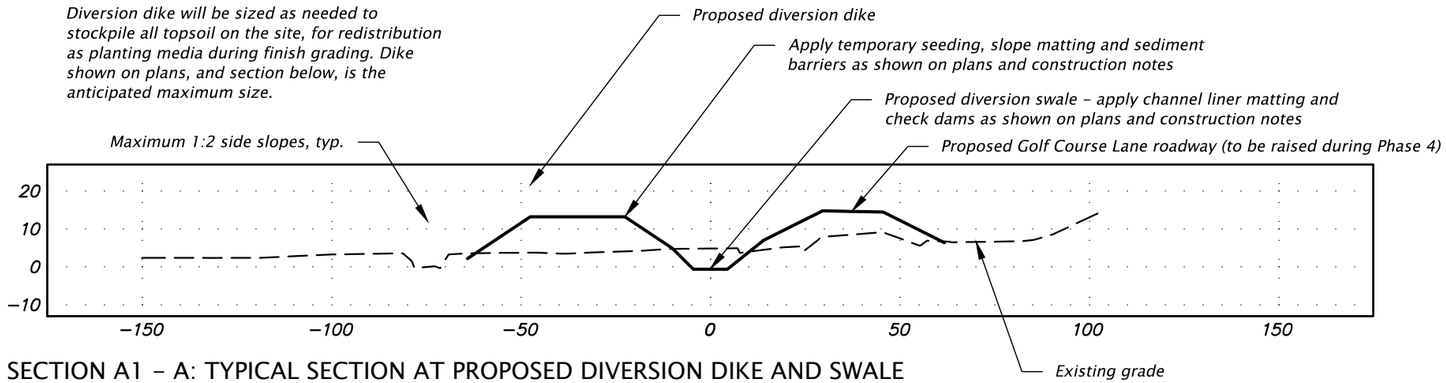
1. *Install temporary construction fencing (See specifications section _____)*
2. *Construct construction entrance, ODOT type 2 (See ODOT drawing no. RD1000)*
3. *Install sediment fence, ODOT type 1 where site conditions permit trenching. Install ODOT type 2 where rock or tree roots prevent trenching. (See ODOT drawing no. RD1040) On existing Kentuck Levee, install sediment fence at toe of proposed fill to be constructed in Phase 2 (See section B1 – B, sht. C123)*
4. *Construct concrete truck wash out facility (See ODOT drawing no. RD1070)*
5. *Construct diversion dike as shown on plans (See CWS drawings no. 850 and typical section, sht.C102)*
6. *Construct diversion swale as shown on plans (See CWS drawings no. 850 and typical section, sht. C102)*
7. *Apply temporary seeding to entire diversion dike. Apply before installation of slope matting. (See specifications section _____)*
8. *Install slope matting on slopes steeper than 3:1, where shown (See ODOT drawing no. RD1055)*
9. *Install channel matting on diversion swale bottom, extending a minimum of 4' up channel sides (See ODOT drawing no. RD1055 and typical section, sht. ___)*
10. *Install check dam, compost filter sock, in diversion swale as shown on plans (200' on center, typ.) (See ODOT drawing no. RD1006)*
11. *Install temporary mulch to stabilize exposed soils as temp. grading progresses (See specs sections _____ and _____ for soil stabilization and mulching requirements)*
12. *Install sediment barrier (compost filter sock) parallel to contours. Place on slopes according to spacing table on ODOT drawing. (See ODOT drawing no. RD1032)*
13. *Install pipe slope drain as directed, to be field located where required during construction of temp. stream diversion (See CWS drawing no. 815)*
14. *Install temporary outfall structure (See C203)*
15. *Install gravel construction staging area*
16. *Access with gravel construction access*
17. *Construct East Bay Rd. Detour*
18. *Construct temporary 24" CMP culvert pipe at construction entrance.*

Note

Any BMPs shown outside the property or easement lines are for graphic clarity. All BMPs to be located within the project property or easements.

Note

Diversion dike will be sized as needed to stockpile all topsoil on the site, for redistribution as planting media during finish grading. Dike shown on plans, and section below, is the anticipated maximum size.



SECTION A1 – A: TYPICAL SECTION AT PROPOSED DIVERSION DIKE AND SWALE

SCALE: 1" = 40'

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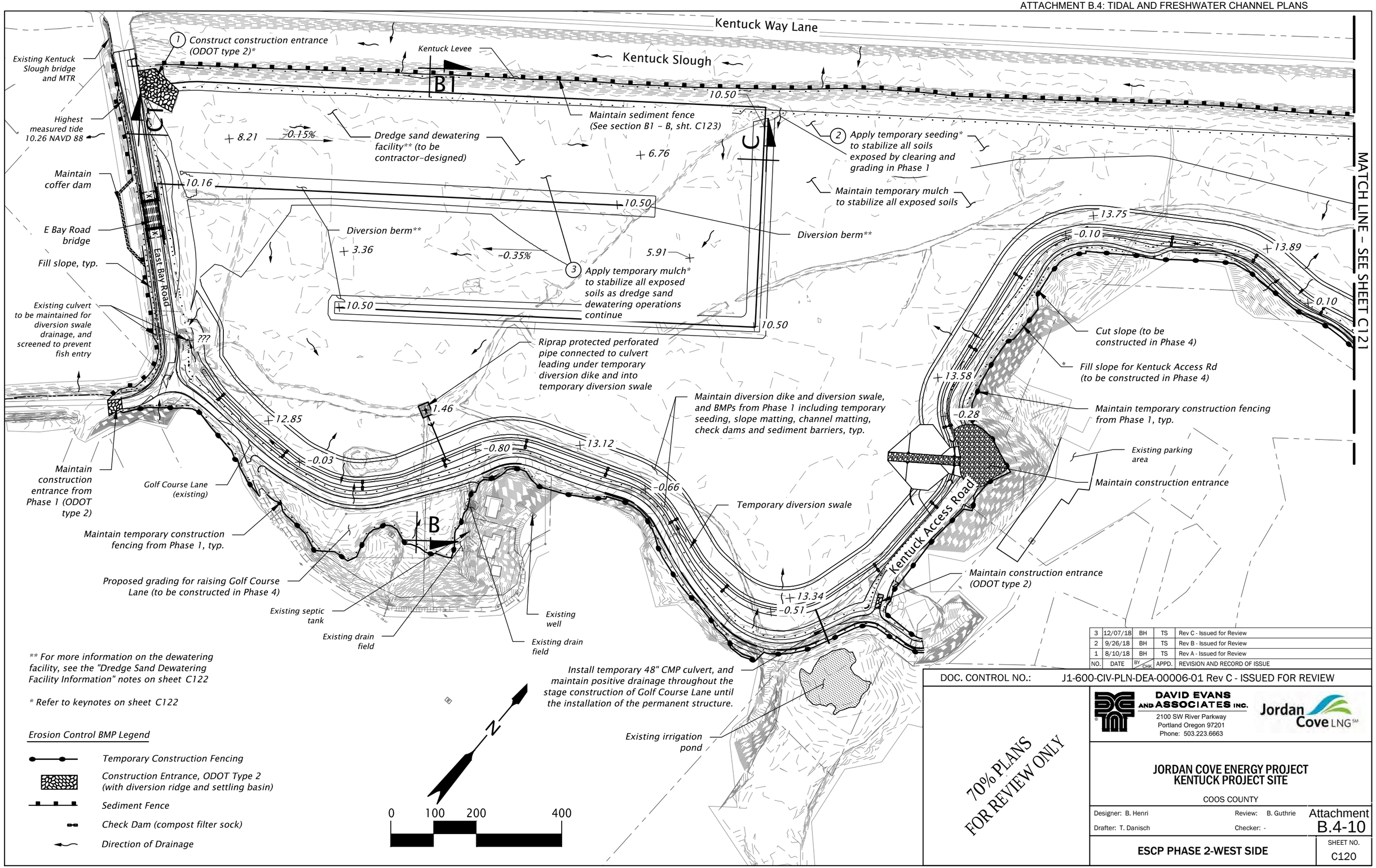
Attachment B.4-9

ESCP PHASE 1 NOTES & KEYNOTES

SHEET NO. C112



** For more information on the dewatering facility, see the "Dredge Sand Dewatering Facility Information" notes on sheet C122

* Refer to keynotes on sheet C122

Erosion Control BMP Legend

- Temporary Construction Fencing
- Construction Entrance, ODOT Type 2 (with diversion ridge and settling basin)
- Sediment Fence
- Check Dam (compost filter sock)
- Direction of Drainage

MATCH LINE - SEE SHEET C121

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Attachment B.4-10

ESCP PHASE 2-WEST SIDE

SHEET NO. C120

MATCH LINE – SEE SHEET C120

Maintain sediment fence
(See section B1 – B, sht. C123)

Kentuck Levee

Kentuck Way Lane

Kentuck Slough

Existing 30" corrugated metal pipe flowing into Kentuck Slough

Existing 72" culvert flowing into Kentuck Slough

Existing pond to be filled

(2) Apply temporary seeding* to stabilize all soils exposed by clearing and grading in Phase 1

Mettman Crk. Rd.

Mettman Creek

Maintain diversion dike and diversion swale, and BMPs from Phase 1 including temporary seeding, slope matting, channel matting, check dams and sediment barriers, typ.

Temporary diversion swale

+0.17
+14.08
+0.30
+14.32
+0.49

Proposed grading
(to be constructed
in Phase 4)

Maintain temporary construction fencing from Phase 1, typ.

+0.66
+14.55
+0.77
+13.75
+12.41
+11.44

Existing 30" corrugated metal pipe flowing into Kentuck Creek

Kentuck Creek

ATV BRIDGE

Existing channel diverted to temporary diversion swale

* Refer to keynotes on sheet C122

Erosion Control BMP Legend

- Temporary Construction Fencing
- Construction Entrance, ODOT Type 2 (with diversion ridge and settling basin)
- Sediment Fence
- Check Dam (compost filter sock)
- Direction of Drainage

N

0 100 200 400

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

DOC. CONTROL NO.: J1-600-CIV-PLN-DEA-00007-01 Rev C - ISSUED FOR REVIEW

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2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG℠

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-11
Drafter: T. Danisch | Checker: -

ESCP PHASE 2-EAST SIDE | SHEET NO. C121

Phase 2 Construction Notes

1. *Construct construction entrance, ODOT type 2 (See ODOT drawing no. RD1000)*
2. *Apply temporary seeding (See specifications section _____)*
3. *Install temporary mulch to stabilize exposed soils as temp. grading progresses (See specs sections _____ and _____ for soil stabilization and mulching requirements)*

Note

Any BMPs shown outside the property or easement lines are for graphic clarity. All BMPs to be located within the project property or easements.

Dredge Sand Dewatering Facility information:

The dewatering facility will be constructed to dewater dredge sand material, which will be used on site for mass grading. The facility is designed with diversion berms and swales, graded to direct runoff out of the complex.

Dredge sand material will be delivered to the project site via temporary pipeline, anticipated to cross through the intersection of East Bay Road and the Kentuck Levee. Saturated dredge sand material will be placed within the dewatering facility in lifts.

Fully dewatered material will be excavated from the dewatering complex, and deposited throughout the Kentuck site via access along the existing Kentuck Levee. The dewatered dredge sand material will be used in mass grading as it becomes available, to be followed by stockpiled topsoil which will be layered above it for mitigation planting.

Runoff from the dewatering facility will be treated as it leaves the facility, travelling through a temporary sedimentation swale and into a riprap protected perforated pipe. The pipe will be installed to penetrate the temporary diversion berm which was constructed for temporary stream diversion. Through this pipe, runoff will be conveyed out of the complex and into the temporary stream diversion swale, where the runoff will travel through several check dams before leaving the site through the existing culvert at the southwest corner of the site.

The dredge sand dewatering facility, as shown on sheet C120, is conceptual and is shown for illustrative purposes. The dewatering complex will be placed and constructed according to contractor means and methods, and may be relocated within the site to accommodate construction sequencing. Runoff and sediment control BMPs must be effectively applied, ensuring that facility runoff is free of sediment before leaving the project site.

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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KENTUCK PROJECT SITE

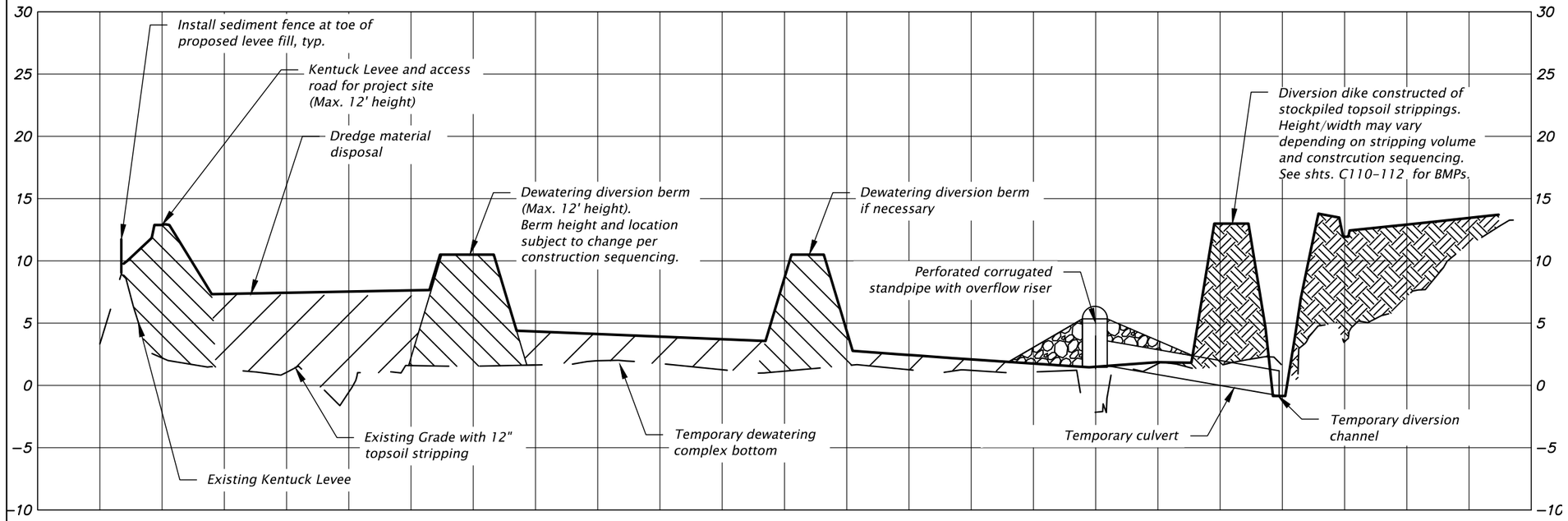
COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Drafter: T. Danisch | Checker: -

Attachment B.4-12

ESCP PHASE 2 NOTES & KEYNOTES

SHEET NO. C122



SECTION B1 - B: DIVERSION COMPLEX SECTION

SCALE: HORIZONTAL 1" = 100', VERTICAL 1"=10'

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
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1	8/10/18	BH		TS	Rev A - Issued for Review

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KENTUCK PROJECT SITE

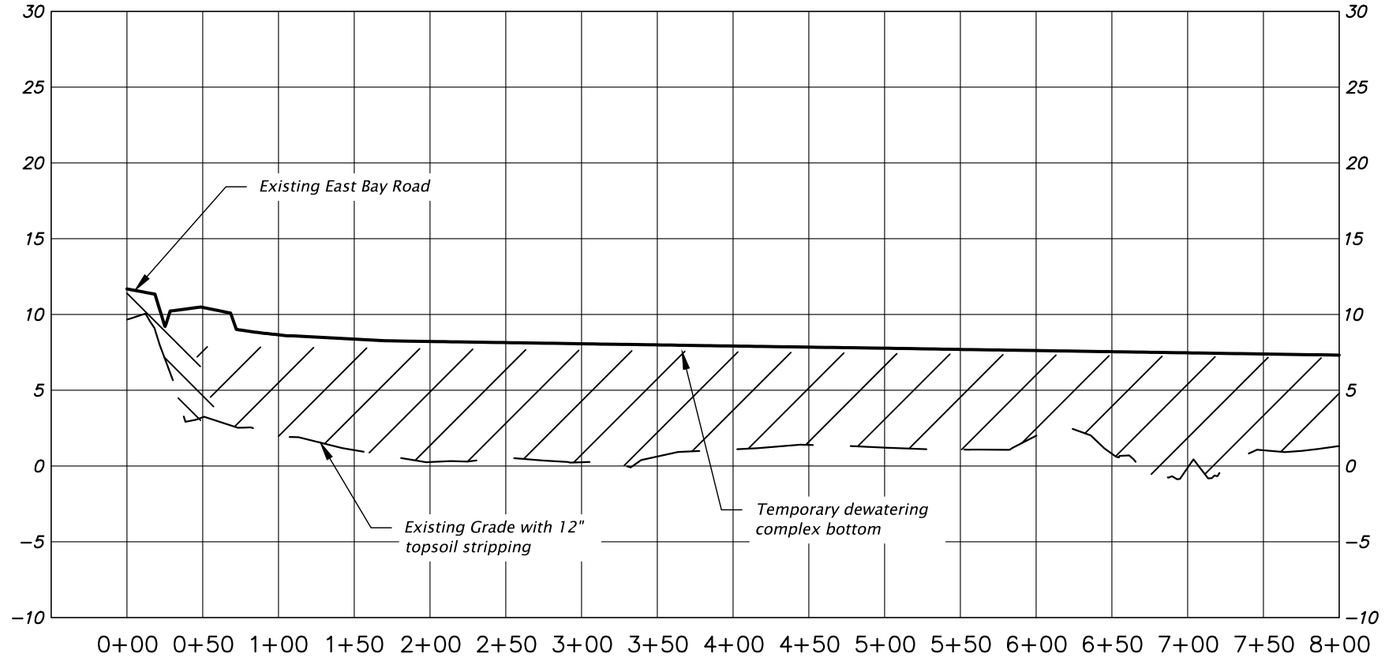
COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Drafter: T. Danisch | Checker: -

Attachment B.4-13

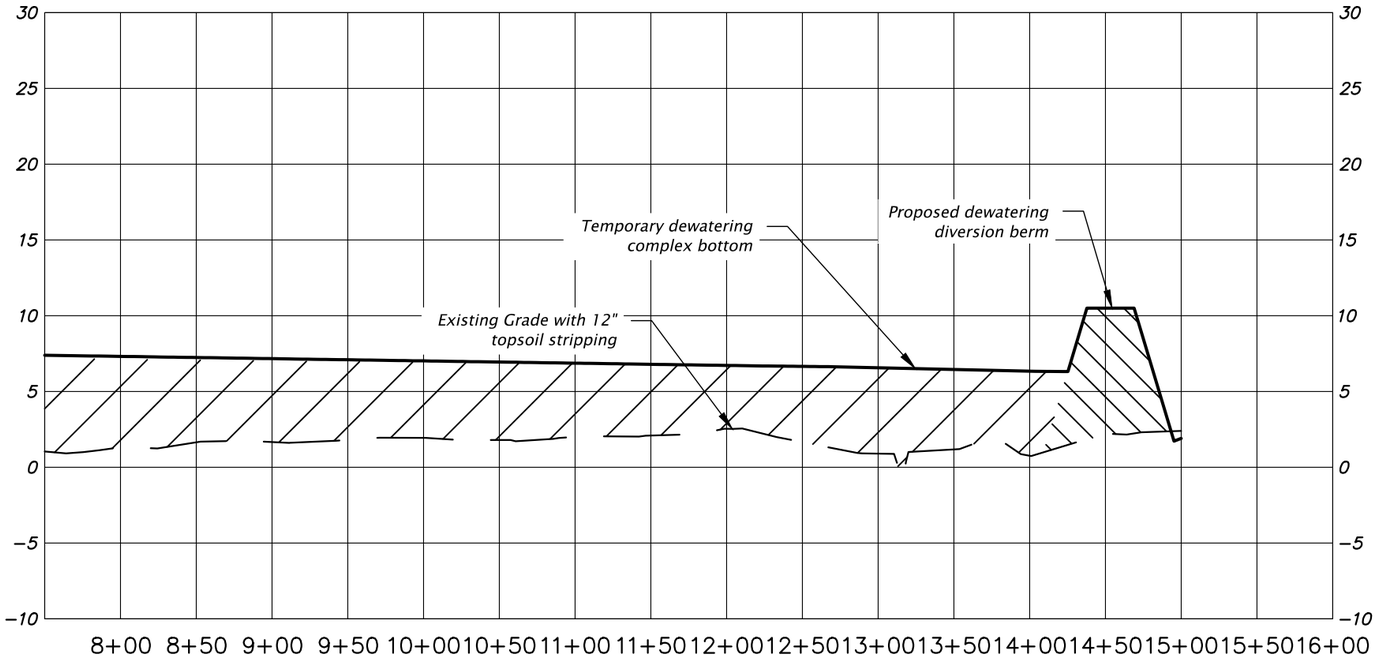
ESCP PHASE 2 PROFILES

SHEET NO. C123



SECTION C1 – C: DIVERSION COMPLEX PROFILE 1

SCALE: HORIZONTAL 1" = 100', VERTICAL 1"=10'



SECTION C1 – C: DIVERSION COMPLEX PROFILE 2

SCALE: HORIZONTAL 1" = 100', VERTICAL 1"=10'

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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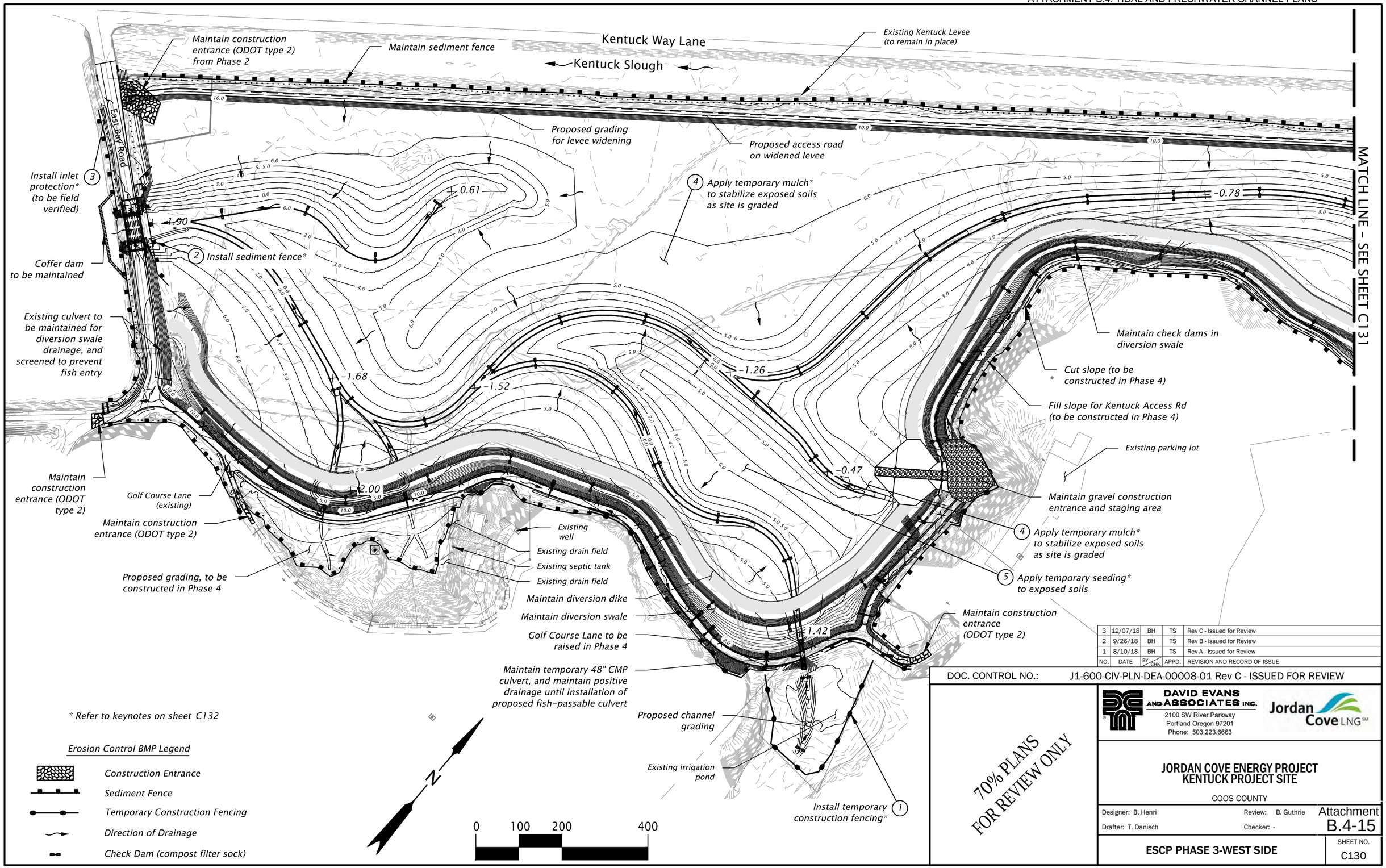
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-14

Drafter: T. Danisch | Checker: -

ESCP PHASE 2 PROFILES | SHEET NO. C124



MATCH LINE – SEE SHEET C131

* Refer to keynotes on sheet C132

Erosion Control BMP Legend

- Construction Entrance
- Sediment Fence
- Temporary Construction Fencing
- Direction of Drainage
- Check Dam (compost filter sock)

NO.	DATE	BY	CHK.	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
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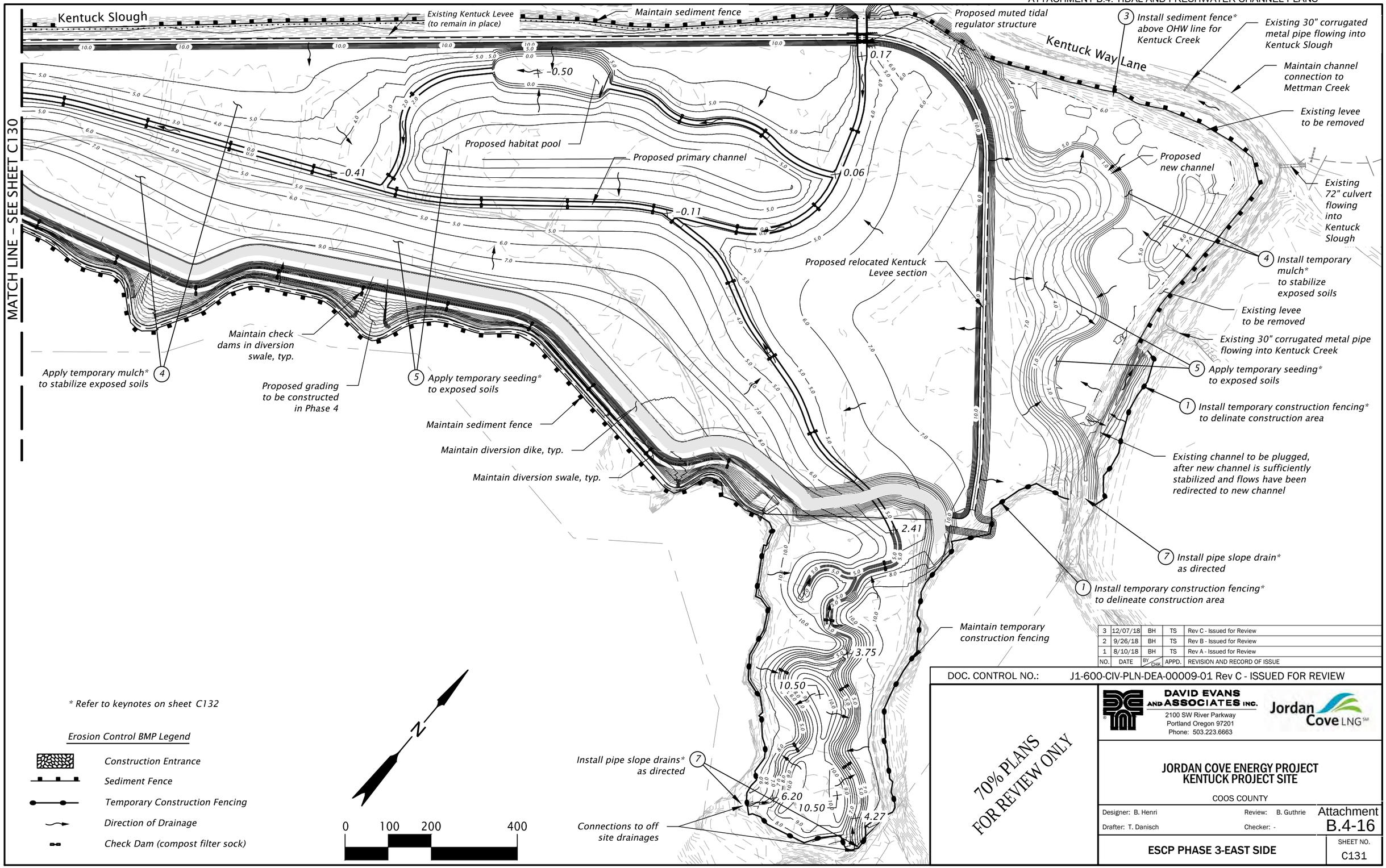
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-15

Drafter: T. Danisch | Checker: -

ESCP PHASE 3-WEST SIDE | SHEET NO. C130



NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-16

Drafter: T. Danisch | Checker: -

ESCP PHASE 3-EAST SIDE | SHEET NO. C131

Phase 3 Construction Notes

1. *Install temporary construction fencing (See specifications section _____)*
2. *Install sediment fence (See ODOT drawing no. RD1040)*
3. *Install sediment barrier, ODOT type 1, where site conditions permit trenching. install ODOT type 2 where rock or tree roots prevent trenching. (See ODOT drawing no. RD1032)*
4. *Apply temporary mulch to stabilize exposed soils as needed, while final grading progresses (See specs sections _____ and _____ for soil stabilization and mulching requirements)*
5. *Apply temporary seeding to exposed soils as needed, while final grading progresses (See specs sections _____ and _____ for soil stabilization and seeding requirements)*
6. *Install sediment barrier (compost filter sock) parallel to contours. Place on scopes according to spacing table on ODOT drawing. (See ODOT drawing no. RD1032)*
7. *Install pipe slope drain as directed, to be field located where required during Phase 3 grading to prevent off site drainages from entering unstabilized construction areas (See CWS drawing no. 815)*

Note

Any BMPs shown outside the property or easement lines are for graphic clarity. All BMPs to be located within the project property or easements.

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Drafter: T. Danisch | Checker: -

Attachment B.4-17

ESCP PHASE 3 NOTES & KEYNOTES

SHEET NO. C132

Kentuck Way Lane

Kentuck Slough

East Bay Road

Install inlet protection* (3) to all new and existing inlets within construction area (to be field located)

Maintain construction entrance (ODOT type 2)

Maintain sediment fence

Maintain sediment fence until upslope channels and slopes are stabilized

Existing Kentuck Levee (to remain in place)

(5) (6) (7) (8) On new fill slope of widened levee:
Apply temporary mulch*
Apply temporary seeding*
Install slope matting*
Install sediment barrier (compost filter sock)*

Coffer dam to be removed when new stream channels are sufficiently stabilized

Existing culvert to be filled or removed after removal of diversion swale

(7) Install slope matting* on all slopes steeper than 1:3, typ.

(8) Install channel matting* throughout all proposed channels, typ.

Install check dams (compost filter sock)* (9) as shown, throughout all channels, typ.

Temporary diversion dike and swale to be removed in stages, as new stream channels are sufficiently stabilized

End of Kentuck access road; Beginning of soft surface trail

Cut slope, typ.

(10) Install sediment barrier (compost filter sock)* on all slopes 1:5 or steeper, typ.

(6) Apply temporary seeding* to all exposed soils, typ.

Gravel construction staging area

(11) Install pipe slope drain* as directed

(5) Apply temporary mulch* to stabilize all exposed soils, typ.

Kentuck access road

Maintain construction entrance (ODOT type 2)

Maintain construction entrance (ODOT type 2)

Golf Course Lane to be raised

Maintain construction entrance (ODOT type 2)

Proposed grading, to protect existing wells and drain field

Existing well

Existing drain field

Existing septic tank

Existing drain field

Install sediment fence* (4)

(11) Install pipe slope drain* as directed

Fill slope, typ.

Golf Course Lane to be raised above tidal and storm surge elevations

Proposed fish-passable culvert to restore tidal connection

Existing irrigation pond

MATCH LINE - SEE SHEET C141

* Refer to keynotes on sheet C142

Erosion Control BMP Legend

- Construction Entrance
- Sediment Fence
- Slope and Channel Matting
- Check Dam (compost filter sock)
- Temporary Construction Fencing
- Direction of Drainage

N

0 100 200 400

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

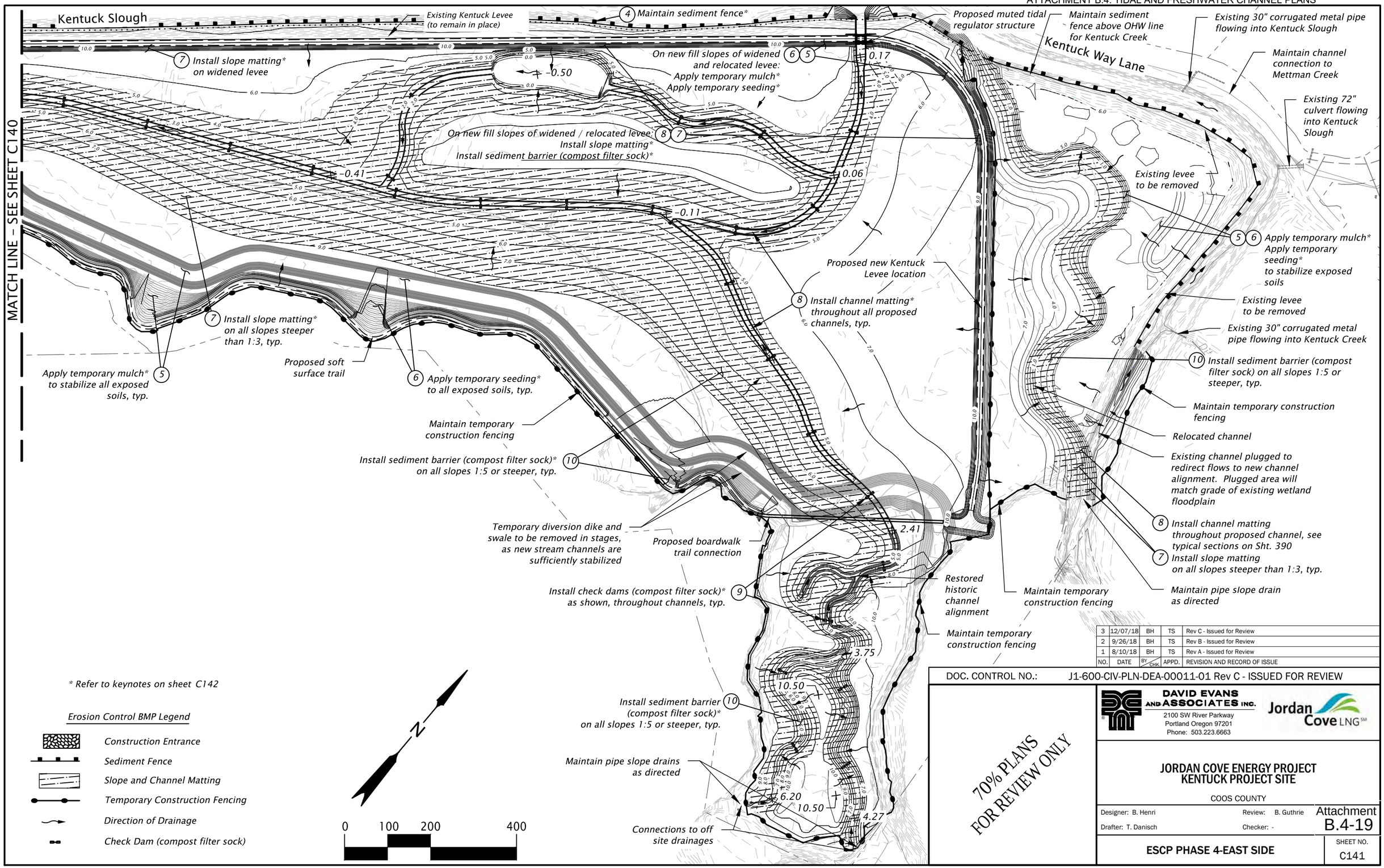
COOS COUNTY

Designer: B. Henri Review: B. Guthrie
Drafter: T. Danisch Checker: -

Attachment B.4-18

ESCP PHASE 4-WEST SIDE

SHEET NO. C140



* Refer to keynotes on sheet C142

Erosion Control BMP Legend

- Construction Entrance
- Sediment Fence
- Slope and Channel Matting
- Temporary Construction Fencing
- Direction of Drainage
- Check Dam (compost filter sock)

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Drafter: T. Danisch | Checker: -

Attachment B.4-19

ESCP PHASE 4-EAST SIDE

SHEET NO. C141

Phase 4 Construction Notes

1. *Install temporary construction fencing (See specifications section _____)*
2. *Construct construction entrance, ODOT type 2 (See ODOT drawing no. RD1000)*
3. *Install sediment fence (See ODOT drawing no. RD1040)*
4. *Install sediment barrier, ODOT type 1, where site conditions permit trenching. install ODOT type 2 where rock or tree roots prevent trenching. (See ODOT drawing no. RD1032)*
5. *Apply temporary mulch to stabilize exposed soils as final grading progresses (See specs sections _____ and _____ for soil stabilization and mulching requirements)*
6. *Apply temporary seeding to exposed soils. Apply after installation of temporary mulch, and before installation of slope or channel matting, as applicable. (See specifications section _____)*
7. *Install slope matting on slopes steeper than 3:1, where shown. (See ODOT drawing no. RD1055)*
8. *Install channel matting on channel bottom extending a minimum of 4' up channel sides (See ODOT drawing no. RD1055 and typical section, sheet ___)*
9. *Install check dam, compost filter sock, as shown on plans (200' on center, typ.). Check dams to be removed after final mitigation establishment and re-establishment of stream flow. (See ODOT drawing no. RD1006)*
10. *Install sediment barrier (compost filter sock) parallel to contours. Place on scopes according to spacing table on ODOT drawing. (See ODOT drawing no. RD1032)*
11. *Install pipe slope drain as directed, to be field located where required during Phase 4 grading and removal of temp. stream diversion (See CWS drawing no. 815)*

Note

Any BMPs shown outside the property or easement lines are for graphic clarity. All BMPs to be located within the project property or easements.

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
3	12/07/18	BH		TS	Rev C - Issued for Review
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

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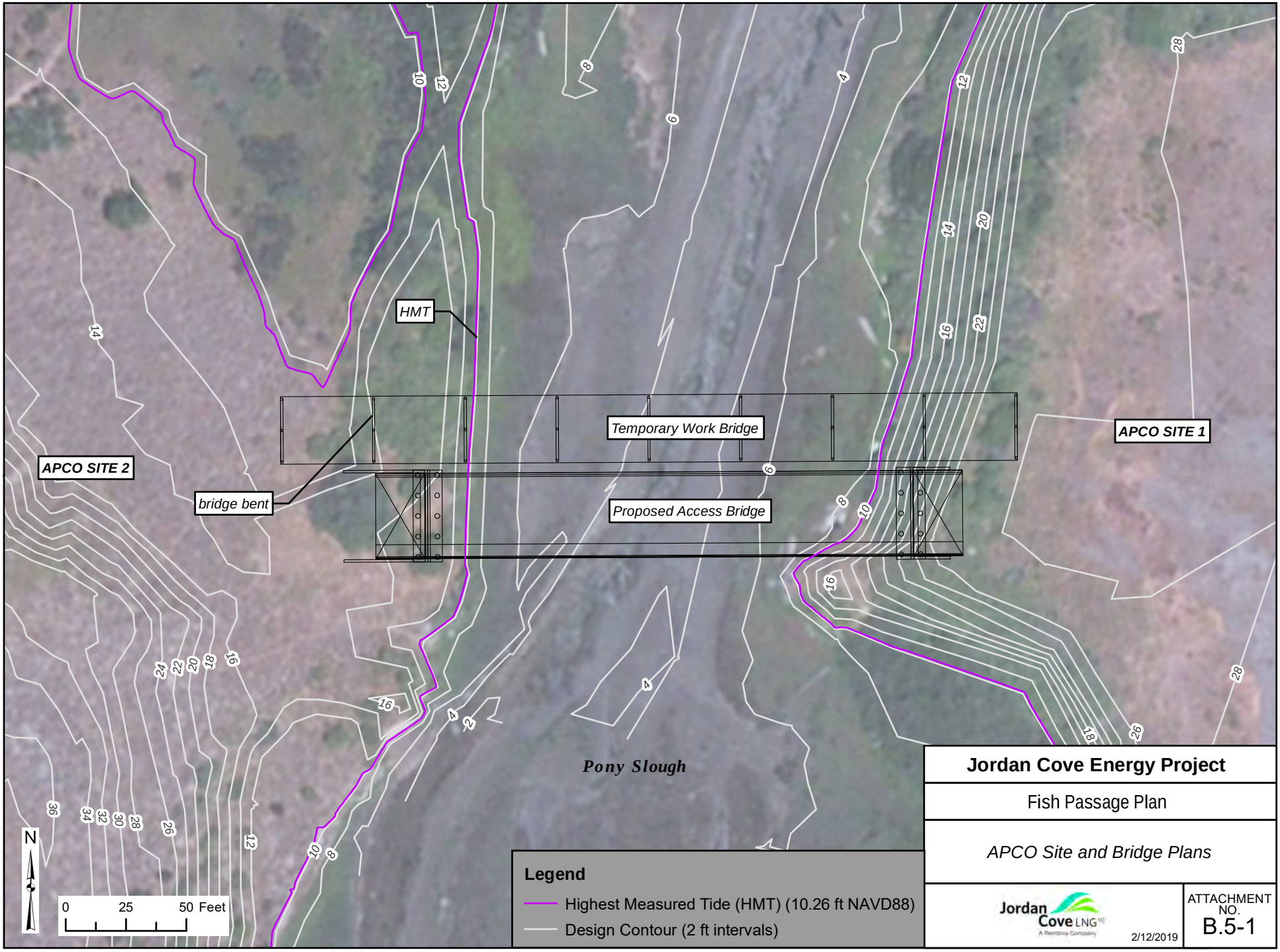
JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie | Attachment B.4-20
Drafter: T. Danisch | Checker: -

ESCP PHASE 4 NOTES & KEYNOTES | SHEET NO. C142

ATTACHMENT B.5: APCO BRIDGE PLANS



Jordan Cove Energy Project

Fish Passage Plan

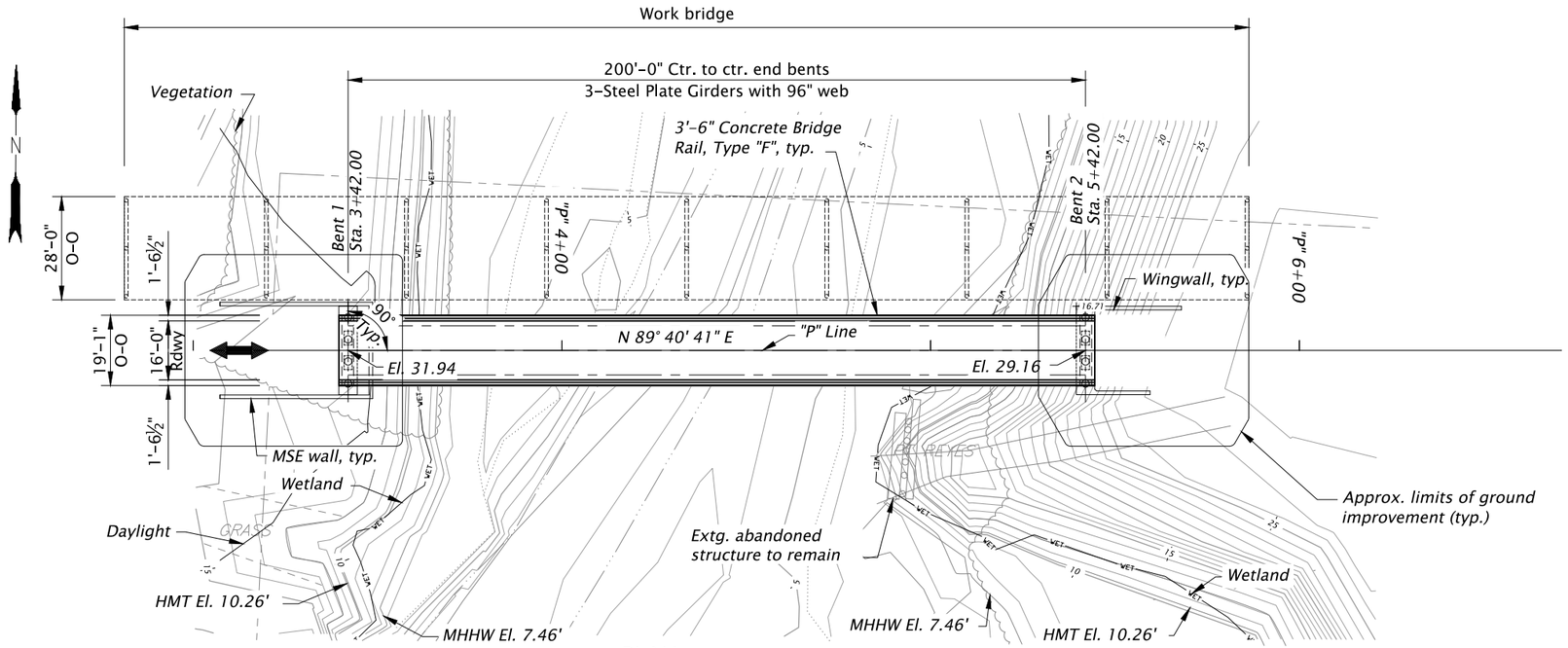
APCO Site and Bridge Plans

Jordan Cove LNG

2/12/2019

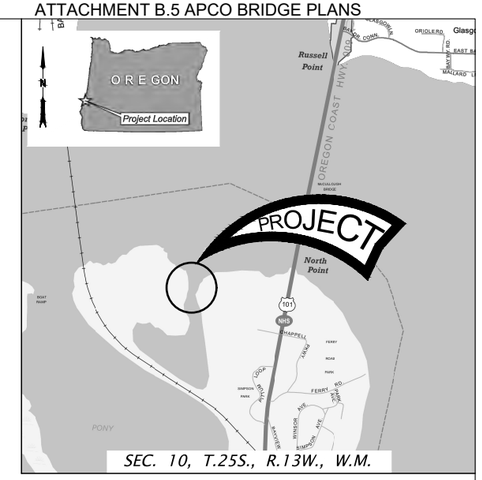
ATTACHMENT NO. B.5-1

\\deainc.com\files\PROJECT\J\JLNG00000001\0600INFO\GS\Maps\ODFW Fish Passage\Attachment B.5-1 APCO Site and Bridge Plans.mxd



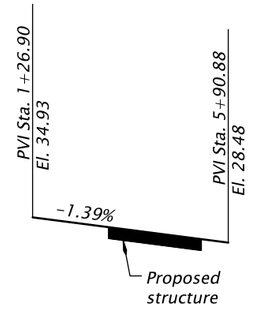
PLAN

Scale: 1" = 20'-0"



LOCATION MAP

No Scale



GRADELINE DIAGRAM

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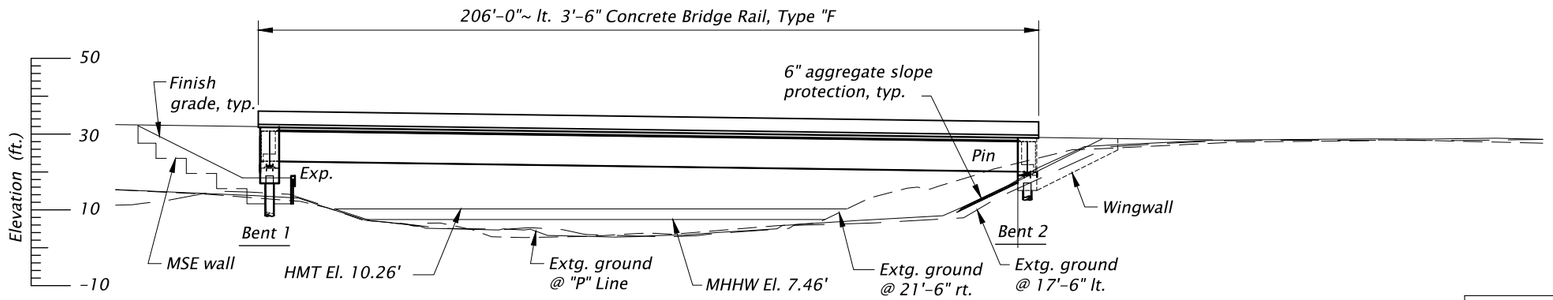

ELEVATION

Scale: 1" = 20'-0"

Notes:
Elevations are based on North American Vertical Datum 1988 (NAVD88).

MHHW = Mean Higher High Water.
MSE = Mechanically Stabilized Earth.
HMT = Highest Measured Tide.

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3	12/07/18	JC		TS	REV C: ISSUED FOR REVIEW
2	10-01-18	JC		TS	REV B: ISSUED FOR REVIEW
1	08-08-18	JC		TS	REV A: ISSUED FOR REVIEW

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Phone: 503.223.6663

Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
NAVIGATION RELIABILITY IMPROVEMENTS
APCO BRIDGE SITE
COOS COUNTY

Designer: Andrew Walker | Review: Terry Stones
Drafter: Jim Culpepper | Checker: Anthony Calcagno

Attachment B.5-2

PLAN AND ELEVATION

SHEET NO. S101

ATTACHMENT C: FISH PASSAGE HYDRAULIC REPORT

Jordan Cove LNG, LLC

Fish Passage Hydraulics

for

Kentuck Project Site

Document Number:

J1-600-CIV-RPT-DEA-00002-00

Prepared for

Jordan Cove LNG

5615 Kirby Drive, Suite 500

Houston, TX 77005

Prepared by

WEST Consultants, Inc.

2601 25th Street SE, Suite 450

Salem, Oregon 97302

February 20, 2019

TABLE OF CONTENTS

Tables

EXECUTIVE SUMMARY

WEST Consultants conducted hydrodynamic computer modeling of a proposed mitigation project at Kentuck Slough. The analysis was used to determine if the project meets Oregon Department of Fish and Wildlife (ODFW) fish passage requirements.

Results of the fish passage analysis indicate that all applicable project components meet the ODFW fish passage criteria for maximum velocity. All applicable project components comply with fish passage criteria for minimum depth. The proposed culvert under Golf Course Lane will alternatively meet ODFW's fish passage requirements using the Stream Simulation methodology.

1. INTRODUCTION

1.1 REPORT PURPOSE

The Kentuck Project Site is located in the northeast portion of Coos Bay, Oregon, east of East Bay Road and south of Kentuck Creek. Various components of the Kentuck Project Site are required to allow for fish passage. It is understood that fish passage is required year-round. A hydraulic analysis is required to demonstrate that the design of the various components of the Kentuck Project Site will meet ODFW fish passage criteria provided in Oregon Administrative Rule (OAR) 635-412.

1.2 PROJECT COMPONENTS

The proposed mitigation site will consist of an engineered system of low-flow tidal channels and tidal salt marsh habitat located immediately southeast of Kentuck Slough in an area that was previously used for a golf course. The proposed mitigation site is currently separated from the slough by a levee. A new engineered levee embankment will be constructed immediately adjacent to the existing levee. The mitigation site will be hydraulically connected to Kentuck Slough using two muted tidal regulator (MTR) gates mounted to a box culvert structure located at the northeast (upstream) end of the site, approximately 4,800 feet upstream from East Bay Road. The mitigation site will be connected to Coos Bay (Kentuck Inlet) via a new bridge in East Bay Road. The mitigation site also includes construction of fresh water habitat (Fresh Water Site) in a portion of Kentuck Creek located upstream from the MTR gates. At the south end of the mitigation site, there is a small unnamed tributary that feeds an existing irrigation pond located immediately upstream of Golf Course Lane. The existing pond push-up dam will be removed, and a new culvert will be placed under Golf Course Lane. A new low flow channel will be constructed upstream of the culvert to connect the unnamed tributary with the southern portion of the mitigation site. A map showing the location of the various project components is provided in Figure 1, (all Figures are located in Appendix A).

2. PREPARERS AND CONTRIBUTORS

James Heyen, P.E., WEST Consultants, Inc. (WEST) Senior Hydraulic Engineer, authored this report. Hans Hadley, P.E., WEST Senior Project Manager, contributed to and edited the report. Tom Grindeland, P.E., WEST Senior Vice President, provided quality review. Terry Stones, P.E., David Evans and

Associates, Inc. (DEA), provided Project Manager level review, Loren Stucker, Biologist, DEA, provided review for fish passage criteria.

3. FISH PASSAGE CRITERIA

Compliance with fish passage requirements for the Kentuck Project Site were evaluated based on ODFW Fish Passage Criteria (OAR 635-412). Specific criteria for each component of the Kentuck Project Site are as follows:

3.1 EAST BAY ROAD BRIDGE

- For hydraulic method, Maximum Velocity = 2 ft/sec for Design Flows
- For hydraulic method, Minimum Depth = 1 ft for Design Flows

3.2 GOLF COURSE LANE REPLACEMENT CULVERT

- Slope is equal to, or continuous with, surrounding long-channel streambed profile
- For Streambed Simulation method, maintain average water depth and velocities in the culvert that mimic those in the natural stream channel
- Culvert Embedment = 20-50% of Culvert Diameter
- Culvert Ceiling Minimum Height = 3 ft above OHW
- Incorporate ODFW recommendations for streambed materials: 30% fines, 30% small rock, 30% large rock, 10% “shadow” rock (boulders).

3.3 MTR STRUCTURES

- Minimum width with gates fully open = 4 ft
- Meet OAR 635-412-0035(2) Requirement for an Average of 51% of Tidal Cycles
- Maximum Velocity = 8 ft/sec for Design Flows
- Minimum Depth = 1 ft for Design Flows
- Free Draining (no entrapment)

3.4 LOWER MITIGATION AREA TIDAL CHANNELS

- Average Channel Velocity between 1-2 ft/sec for Design Flows
- Minimum Depth = 12 inches for Design Flows
- Minimum Width = 12 inches for Design Flows

3.5 FRESH WATER SITE CHANNELS

- Average Channel Velocity between 1-2 ft/sec for Design Flows
- Minimum Depth = 12 inches for Design Flows
- Minimum Width = 12 inches for Design Flows

4. DATA USED IN THE ANALYSIS

4.1 TERRAIN

Data characterizing the terrain of the study area were collected from several sources and merged together to create a comprehensive coverage of both terrestrial and bathymetric elevation data. The following detailed topographic data were used in the analysis:

- Bathymetric survey data collected by David Evans and Associates, Inc. (DEA) covering the Kentuck Inlet (August 2014).
- Survey data collected by DEA covering the contributing areas and irrigation pond (July 2014).
- Proposed ground surface for the entire mitigation area, fresh water site, and slough developed by DEA and provided as a 1-foot resolution raster (October 2018).

The above data sources were supplemented where necessary with high-resolution Light Detection and Ranging (LiDAR) data collected by the Oregon Department of Geology and Mineral Industries (DOGAMI) in 2008. The data were accessed from the National Oceanic and Atmospheric Administration (NOAA) Data Access Viewer online portal. Unless stated otherwise, all elevations in this report are referenced to the North American Vertical Datum of 1988 (NAVD88).

4.2 LAND USE (ROUGHNESS) CHARACTERISTICS

The proposed mitigation site will include modifications to the existing land cover in order to create a habitat consisting of mud flats, tidal marshes, willow scrub, and wetland forested areas. Data characterizing the proposed land cover was provided by DEA for use in defining the hydraulic roughness properties of the model geometry. Table 1 presents the land cover types and the associated hydraulic roughness (Manning's *n*) values used in the hydraulic model.

Table 1 - Land Cover Hydraulic Roughness

Land Cover	Manning's *n*
Coos Bay Open Water	0.030
Brush	0.070
Tidal Mudflat	0.030
Willow Scrub	0.090
Forested	0.085
Forested Wetland	0.100
Slough	0.030
Slough Overbanks	0.045
Levee	0.025
Salt Marsh	0.040
Tidal Island	0.100

4.3 HYDROLOGY

4.3.1 Fish Passage Design Flows

Previous hydraulic analyses of Kentuck Slough were conducted by WEST. The USGS StreamStats program was used to estimate flow-duration information using regional regression equations developed by John Risley et.al. (2009). Fish passage design flows developed using the USGS StreamStats program are summarized in Table 2. Locations of the involved creeks are shown in Figure 1.

Table 2 - Fish Passage Design Flows

Subbasin	Area (sq. miles)	95% Exceedance (cfs)	5% Exceedance (cfs)
Kentuck Creek	9.00	2.0	115.2
Mettman Creek	3.00	0.7	38.4
Unnamed Tributary (Front Nine)	0.37	0.08	4.74
Unnamed Tributary (Golf Course Ln)	0.26	0.06	3.33

4.3.2 Annual Hydrograph

In addition to the fish passage design flows, an annual flow hydrograph was needed for input to an unsteady hydraulic model of the MTR gates in order to estimate the percentage of time the gates are considered fish passable. Since there is no flow gauge data for Kentuck Creek, the annual hydrograph was created from the USGS flow-duration information. However, the USGS methodology provides only

the 5-, 10-, 25-, 50-, and 95-percent exceedance flows. Therefore, a best fit line was developed from the data to estimate the unit discharge (cfs/mi^2) for each percent exceedance value. The simulation time at which the 95- and 5-percent exceedance flows occur were then identified on the best fit line and the times at which those flows occurred were used as the beginning and end of the annual simulation. As a result, the simulation only considers flow values within the 95- and 5-percent exceedance range. The annual hydrograph produced from the flow-duration information is presented in Figure 2.

4.4 TIDAL BOUNDARY CONDITIONS

The downstream boundary for the analysis is the Kentuck Inlet, situated at the eastern edge of Coos Bay. Characteristics of the tidal cycle for Kentuck Inlet were developed using three-dimensional hydrodynamic modeling of Coos Bay conducted by Coast and Harbor Engineering (CHE). That modeling produced representative day-to-day and 25-year tidal patterns for the Kentuck Inlet. In November 2005, a WEST hydrosurvey crew measured two days of tide heights at the existing tide gates located at the mouth of Kentuck Slough. The measurements captured both high and low tide conditions over two days. The final tide cycle utilized in the analysis is based on the hydrodynamic modeling by CHE and adjusted to reflect the measured minimum and maximum stages recorded in the field by WEST. Figure 3 shows the final adjusted tide cycle utilized for the fish passage analysis.

5. MODEL SIMULATIONS AND RESULTS

5.1 MODEL SIMULATIONS

Detailed unsteady hydraulic modeling was conducted in order to evaluate the proposed Kentuck Project Site for compliance with fish passage criteria. The modeling was conducted using the U.S. Army Corps of Engineers, Hydrologic Engineering Center's (HEC) River Analysis System (RAS) software version 5.0.5. HEC-RAS is a computer program that models the hydraulics of water flow through natural systems and is capable of simulating a variety of structures, including the proposed MTR gates.

A total of five fish passage scenarios were modeled. Two for existing conditions with constant upland inflows depicting both the 95- and 5-percent exceedance discharges; two for proposed conditions with constant upland inflows for the 95- and 5-percent exceedance discharges; and one for the full range of flows between the 95- and 5-percent exceedance discharges. Proposed conditions simulations included the following features: the Mitigation Site, Freshwater Site, MTR gate structure, East Bay Road bridge, and the culvert under Golf Course Lane. All scenarios utilized the representative day-to-day tide cycle for a downstream boundary. The first four scenarios simulated a typical two-day tide cycle for the Kentuck Inlet. The fifth scenario used this same two-day tide cycle, replicated over the full duration of the simulation.

The first four scenarios were modeled using a combination of one-dimensional (1D) and two-dimensional (2D) analysis. The portion of Kentuck Slough located downstream of the new MTR structure and the portion of Kentuck Creek located upstream of the fresh water site were all modeled in 1D. The proposed mitigation site, fresh water site, Kentuck Inlet, and the portion of Kentuck Slough near the new MTR gates were modeled in 2D in order to more accurately evaluate the hydrodynamics of the system with

respect to depths and velocities required for fish passage. These four scenarios were formulated specifically for the purpose of evaluating fish passage criteria along the system of conveyance channels. The 95-percent exceedance model runs were considered most relevant for evaluation of the minimum depth criteria, whereas the 5-percent exceedance model runs are considered most relevant for evaluation of the maximum velocity criteria.

The fifth scenario was modeled specifically for evaluation of the proposed MTR gate structure that will be located at the upstream end of the mitigation site where it connects to the existing main channel of Kentuck Slough. The operation of the MTR gate structure is critical to the project as it will be responsible for achieving both the desired habitat in the mitigation reach and for achieving the goals of project stakeholders with regard to limiting the extent to which salt water intrudes upstream during the daily tide cycle. ODFW fish passage criteria states that the proposed gates must meet the requirements of OAR 635-412-0035(2) for an average of 51% of tidal cycles. In order to achieve this, the model was revised such that the entire geometry was depicted as one-dimensional (for computational efficiency) and then the simulation was adjusted to span the time frame where the flow duration hydrograph included only the 95- to 5-percent exceedance discharges. Performance of the proposed MTR gates was recorded on an hourly basis over the entire simulation in order to extract depth and velocity information and track whether the gates were open and passable. The extracted information was evaluated to determine the MTR structure's ability to meet the fish passage criteria.

It should be noted that maximum velocity and minimum depth results presented in the following tables are sampled from the entire 2-day simulation. As such, the maximum velocity and minimum depth values do not occur at the same moment in time.

5.2 SIMULATION RESULTS – CONVEYANCE CHANNELS

The following sections consider the performance of the proposed mitigation at representative conveyance channels throughout the site (lower mitigation site tidal channels, fresh water site channel, MTR inlet and outlet channels). According to ODFW Fish Passage Criteria (OAR 635-412), the maximum average allowable velocity in conveyance channels is 2 ft/sec and the minimum depth is 1 foot. Where applicable, both depth and velocity were assessed for fish passage criteria over the day-to-day tidal cycle by considering the range from mean low water (MLW; el. 2.90 ft, NAVD88) to mean high water (MHW; el. 5.14 ft, NAVD88). As seen in the following sections, simulation results indicate that the proposed conveyance channels meet ODFW fish passage criteria.

5.2.1 Lower Mitigation Site Tidal Channels

Tidal channels provide conveyance of flow throughout the lower portion of the proposed Kentuck Project Site, with a primary eight-foot wide trapezoidal channel running from the East Bay Road Bridge opening up to the MTR gate structure. The tidal channels are designed to maintain flow through the Lower Mitigation Site even during the low water conditions of ebb tide. Outside of the conveyance channels are low benches on either side with overbank habitat including salt marsh, willow scrub, and forested wetland. The Lower Mitigation Site also includes two off-channel fish shelter habitats. A variety of large

woody debris structures are proposed at select locations throughout the Lower Mitigation Site. These structures consist of individual root wads and engineered log assemblies up to 40 feet in length. Their dimensions and locations were provided by DEA. Detailed maps of two representative locations in the tidal channels (Location 1 and Location 2) are provided in Figures 4 and 5. The black dots on the maps indicate the locations where velocity and depth data were extracted from the hydraulic model.

Table 3 in Section 5.2.4 presents a summary of fish passage results for both the 95- and 5-percent exceedance flows in all conveyance channels over the tidal range.

Figure 6 shows time-series output at the representative Lower Mitigation Site tidal channel locations for velocity and depth in graphical format. Figures 7 and 8 are maps of the maximum velocity and minimum depth, respectively, at Location 1. Similarly, Figures 9 and 10 present maximum velocity and minimum depth at Location 2.

As the results in Table 3 and Figures 6 through 10 show, the Lower Mitigation Site tidal channels meet the velocity and depth requirements for fish passage for each exceedance flow.

5.2.2 Fresh Water Site Channels

The Fresh Water Site is an approximately 1,500 ft long realigned segment of the main channel of Kentuck Slough and Kentuck Creek located upstream of the proposed MTR gate structure. The proposed Fresh Water Site has features similar to the Lower Mitigation Site including a trapezoidal channel with low benching on either side and overbank habitat including salt marsh, willow scrub, and forested wetland. Because of its location upstream of the MTR structure, tidal fluctuations and salt water intrusion will be limited in the Fresh Water Site. Detailed maps of two representative locations (Location 1 and Location 2) in the Fresh Water Site are provided in Figure 11. The black and red dots (Locations 1 and 2, respectively) on the map indicate the locations where velocity and depth data were extracted from the hydraulic model.

Table 3 in Section 5.2.4 present summaries of fish passage results for both the 95- and 5-percent exceedance flows in all conveyance channels. Figure 12 shows time-series output at the two Fresh Water Site channel locations for velocity and depth in graphical format. Figures 13 and 14 are maps of the maximum velocity and minimum depth, respectively, in the two Fresh Water Site channel locations.

As the results in Table 3 and Figures 12 through 14 show, the Fresh Water Site channels meet the velocity and depth requirements for fish passage for each exceedance flow.

5.2.3 Upstream and Downstream of Proposed MTR Structure

The proposed MTR structure will be located between the Lower Mitigation Site and the Fresh Water Site, and will be constructed within an approximately 60-foot long by 20-foot wide channel that cuts through the existing embankment along the south side of the slough. The main low flow tidal channel located within the Lower Mitigation Site starts immediately downstream of the proposed MTR structure. Fish

passage criteria were evaluated with respect to the requirements of a conveyance channel at locations immediately upstream and downstream from the MTR structure. The gate openings, which are subject to different fish passage criteria, were evaluated separately and are discussed in Section 5.3. A detailed map showing the areas immediately upstream and downstream of the proposed MTR structure is provided in Figure 15. The black and red dots on the map (upstream and downstream, respectively) indicate the locations where velocity and depth data were extracted from the hydraulic model.

Table 3 in Section 5.2.4 presents a summary of fish passage results for both the 95- and 5-percent exceedance flows in all conveyance channels. Figure 16 shows graphical time-series output for velocity and depth in the channel reaches located immediately upstream and downstream of the proposed MTR structure. Figures 17 and 18 are maps of the maximum velocity and minimum depth, respectively, upstream and downstream of the proposed MTR Structure.

As the results in Table 3 and Figures 16 through 18 indicate, the channel reaches located immediately upstream and downstream of the proposed MTR structure meet the velocity and depth requirements for fish passage for each exceedance flow.

5.2.4 Summary of Results – Conveyance Channels

Table 3 summarizes the hydraulic model results for the project's conveyance channels. As seen in the table, velocities are less than the maximum allowable 2 ft/sec at all locations for each exceedance flow using the tidal range. Table 3 also indicates that the minimum depth criterion is satisfied at all conveyance channel locations.

Table 3 – Velocity & Depth Results Summary for Conveyance Channels

Location	Maximum Velocity (ft/sec)		Minimum Depth (ft)	
	95% Exceed Q	5% Exceed Q	95% Exceed Q	5% Exceed Q
Lower Mitigation Site Tidal Channel (Site 1)	0.6	0.5	1.4	3.4
Lower Mitigation Site Tidal Channel (Site 2)	1.4	0.9	4.1	4.2
Fresh Water Site Channel (Site 1)	0.3	1.8	2.2	3.1
Fresh Water Site Channel (Site 2)	0.2	1.3	2.2	3.6
Upstream of Proposed MTR Structure	0.9	0.7	2.7	3.5
Downstream of Proposed MRT Structure	0.8	0.7	2.8	3.2

5.3 SIMULATION RESULTS – STREAM CROSSING STRUCTURES

As previously described, ODFW fish passage requirements for stream crossing structures differ from those of conveyance channels. The following sections consider the performance of the proposed mitigation project at stream crossings within the site (East Bay Road bridge opening, proposed MTR structure, and Golf Course Lane replacement culvert).

5.3.1 East Bay Road Bridge

The proposed East Bay Road Bridge will be located at the southeast end of the mitigation site and will connect the site with the Kentuck Inlet of Coos Bay. It is depicted in the model geometry as a 60-foot wide vertical-wall opening in the embankment that carries East Bay Road. A detailed map of the area is presented in Figure 19.

Results of the fish passage evaluation for the East Bay Road Bridge opening are summarized in Table 4. Figure 20 shows the time-series output of velocity and depth for the East Bay Road opening in graphical format. Figures 21 and 22 are maps of the maximum velocity and minimum depth, respectively.

Table 4 – Velocity & Depth Results for East Bay Road Bridge

Location	Maximum Velocity (ft/sec)		Minimum Depth (ft)	
	95% Exceed Q	5% Exceed Q	95% Exceed Q	5% Exceed Q
East Bay Road Bridge	0.9	0.6	4.8	4.9

Per OAR 635-412, maximum velocity is 2 ft/sec; minimum depth is 1 foot (hydraulic method)

As seen in Table 4, maximum velocities through the East Bay Road Bridge opening for each exceedance flow over the tidal range remains below the maximum allowable velocity of 2 ft/sec. The similarity in the maximum velocity values for the 95- and 5-percent exceedance flows indicates that the velocity through the bridge opening is primarily a function of the movement of water resulting from tidal dynamics as opposed to the upstream inflow from the contributing watershed. Table 4 also shows that the minimum depth criterion is satisfied.

5.3.2 Proposed MTR Structure

The proposed MTR structure is integral to the intended function of the mitigation site. The structure is responsible for regulating the flow of water between Kentuck Slough and the Lower Mitigation Site, including limiting the intrusion of saltwater from the Lower Mitigation Site into Kentuck Slough and Kentuck Creek. There will be one MTR gate and one standard side-hinge gate, oriented side by side in the structure, which will be located in a short channel connecting the slough with the lower mitigation site. The MTR gate operates based on the water surface elevation (WSEL) upstream of the structure (the slough side), and is designed in such a manner that it maintains sufficient flow for fish passage, limits saltwater intrusion upstream of the structure, and provides for limited flood risk reduction.

The proposed side-hinge gate has the following dimensions and operational parameters:

- When the gate experiences a positive head differential (upstream WSEL > downstream WSEL) the gate remains open.
- When the gate experiences a negative head differential (upstream WSEL < downstream WSEL) the gate closes.

The proposed MTR gate has the following dimensions and operational parameters:

- Gate Dimensions: width = 7.9 feet, height = 10 feet, invert elevation = 0.19 feet
- When the gate experiences a positive head differential (upstream WSEL > downstream WSEL), the gate remains open.
- When the gate experiences a negative head differential (upstream WSEL ≤ downstream WSEL) and the slough water surface elevation is less than 3.7 feet, the gate remains open.
- When the gate experiences a negative head differential (upstream WSEL ≤ downstream WSEL) and the slough water surface elevation is at or above 3.7 feet, the gate closes.

Results of the fish passage evaluation for the proposed MTR structure are summarized below in Table 5. As the table indicates, the proposed MTR gate will be compliant with fish passage minimum depth and maximum velocity requirements for a total of 52.2% of all tide cycles over the range of flows between the 95- and 5-percent exceedance discharges. The depth and velocity values reported in Table 5 are minimums and maximums, respectively, which occur during the period of time when the MTR structure is compliant with the depth and velocity requirements.

Table 5 – Velocity & Depth Results for Proposed MTR Structure

Location	Maximum Velocity[2] (feet/second)	Minimum Depth[2] (feet)	% of Tide Cycles Gate Open and in Compliance with Velocity/Depth Criteria[2]
Proposed MTR Gate[1]	3.5	1.0	52.2%

1) Per OAR 635-412, maximum velocity is 8 ft/sec; minimum depth is 1 foot; gate to remain open and meet velocity and depth criteria for 51% of tide cycles.

2) Values in table reflect conditions when the MTR gate(s) are open 2 feet or more.

5.3.3 Golf Course Lane Culvert

The proposed culvert under Golf Course Lane will be located near the south end of the mitigation site and will provide fish passage between a small unnamed tributary to Kentuck Inlet. Under existing conditions, this small drainage is inaccessible to migratory aquatic species due to the undersized and perched characteristics of the culverts passing through the roadway, adjacent berm, and existing irrigation pond.

The replacement culvert design will utilize a natural-bottom culvert that is nine feet in diameter with a two-foot wide and six-inch-deep notch to increase flow depths during low flow conditions. The natural bottom of the culvert will consist of native gravel- and cobble-sized material, which will be sized

appropriately to prevent the material from being washed out. The gradation of the material will generally align with ODFW recommendations for streambed material, outlined in Section 3.2; but ultimately, sizing of the streambed material will be based on hydraulic analysis. The culvert is proposed to be an open-bottom culvert with foundations running parallel to the active channel. A minimum of 3 feet of clearance will be maintained between the active channel elevation and the top of the culvert. The slope of the proposed culvert matches the slope of the low flow channel immediately downstream: approximately 0.5%. The slope of the channel immediately upstream from the proposed culvert transitions gradually to approximately 1.8%. A copy of the draft culvert design plans is included in Appendix B.

The proposed Golf Course Lane culvert will satisfy fish passage requirements under the stream simulation methodology listed in Section 3.2 of this report. The substrate and flow conditions in the culvert are designed to mimic the natural streambed above and below the culvert. Table 6 summarizes the depth and velocity at cross sections upstream, within, and downstream of the proposed culvert. It should be noted that depth and velocity are heavily influenced by the tidal conditions downstream and within the proposed culvert.

Table 6 – Velocity & Depth Results for Proposed Golf Course Lane Culvert

Location	Average Velocity (ft/sec)		Average Depth (ft)	
	95% Exceed Q	5% Exceed Q	95% Exceed Q	5% Exceed Q
Downstream of Proposed Culvert[1]	<0.1	0.2	2.8	3.0
Within Proposed Culvert[2]	0.2	0.6	2.4	2.6
Upstream of Proposed Culvert[3]	0.4	0.8	1.2	1.4

1) *Downstream of culvert averages values sampled at cross sections from culvert exit to approximately 120 feet downstream*
2) *Within culvert averages values sampled along the interior of the full culvert length*
3) *Upstream of culvert averages values sampled at cross sections from culvert inlet to approximately 120 feet upstream*

6. CONCLUSIONS

Results of the fish passage analysis for the Kentuck Project Site are summarized in Table 7. As seen in the table, all applicable project components meet the ODFW fish passage criteria for maximum velocity. Similarly, all applicable project components comply with fish passage criteria for minimum depth. The proposed Golf Course Lane culvert will alternatively meet ODFW's fish passage requirements using the Stream Simulation methodology.

Table 7 – Fish Passage Results Summary for Proposed Project Components

Project Component	Meets Maximum Velocity Criteria	Meets Minimum Depth Criteria	Meets Gate Opening Criteria
Conveyance Channels			
Mitigation Site Tidal Channels	Yes	Yes	n/a
Fresh Water Site Channel	Yes	Yes	n/a
Upstream of Proposed MTR	Yes	Yes	n/a
Downstream of Proposed MTR	Yes	Yes	n/a
Stream Crossing Structures			
East Bay Road Bridge Opening	Yes	Yes	n/a
Proposed MTR Structure	Yes	Yes	Yes[3]
Golf Course Lane Culvert	n/a [1, 2]	n/a [2]	n/a

1) Maximum velocity is less than 2 ft/sec for the majority of the length of the culvert but is 4.05 ft/sec at the pipe outlet, which is less than the 8 ft/sec criterial for fishways

2) Stream simulation method will be applied to the Golf Course Lane Culvert

3) Meets OAR 635-412-0035(2) requirements for an average of 51% of tidal cycles

7. REFERENCES

Oregon Administrative Rules, Oregon Department of Fish and Wildlife: Division 412, Fish Passage, Adopted January 2006, Revised January 2015, 14 p.

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p.

8. APPENDICES

APPENDIX A: FIGURES

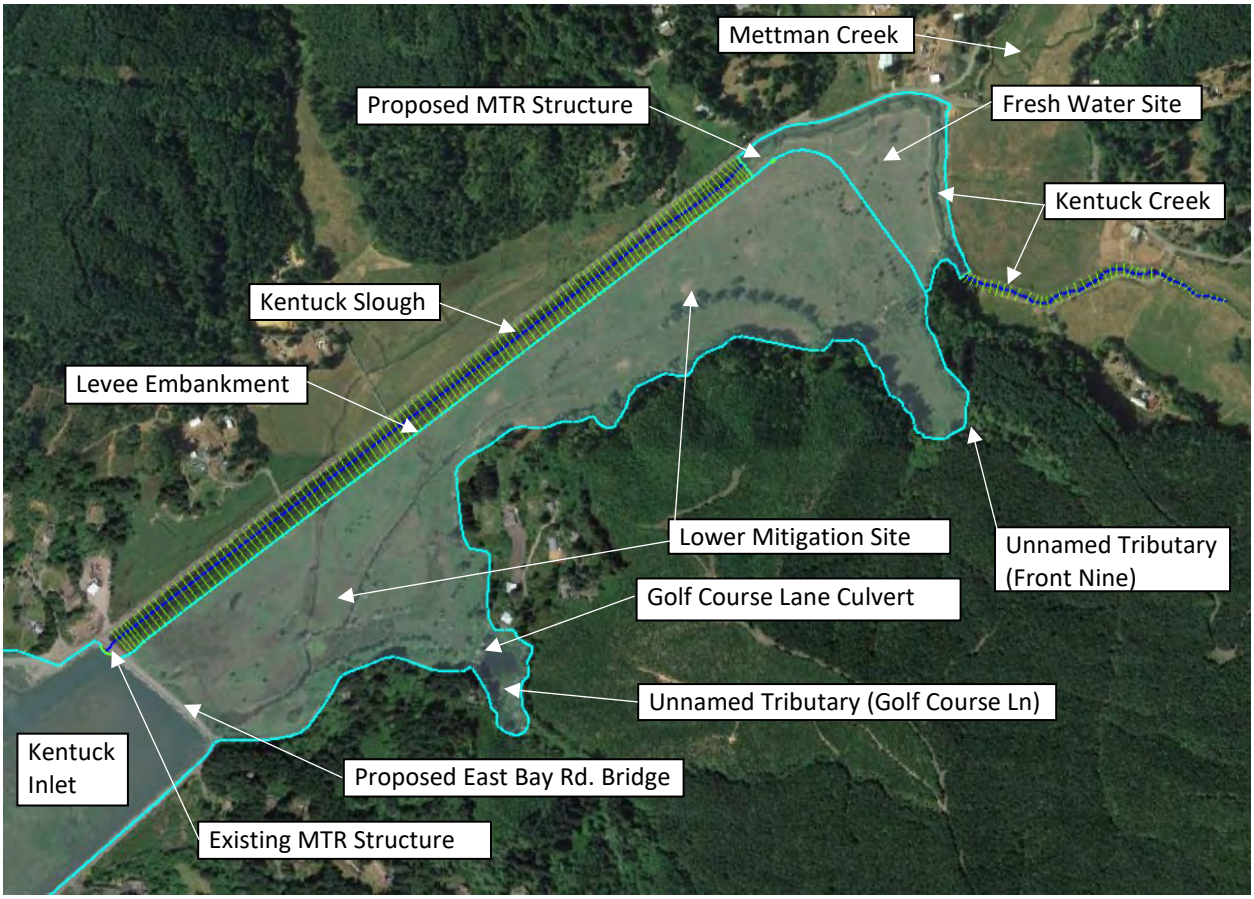


Figure 1 – Location Map of Project Components

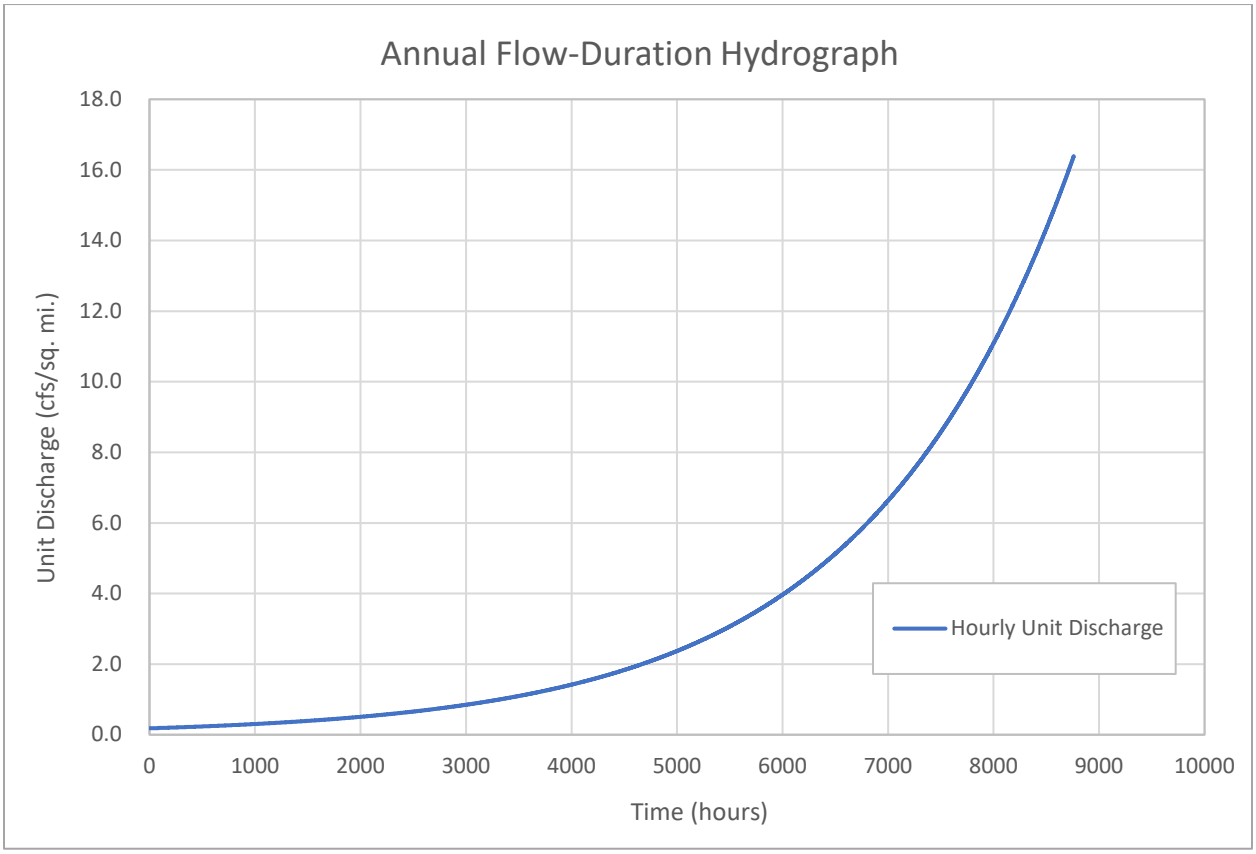


Figure 2 – Annual Flow Duration Hydrograph

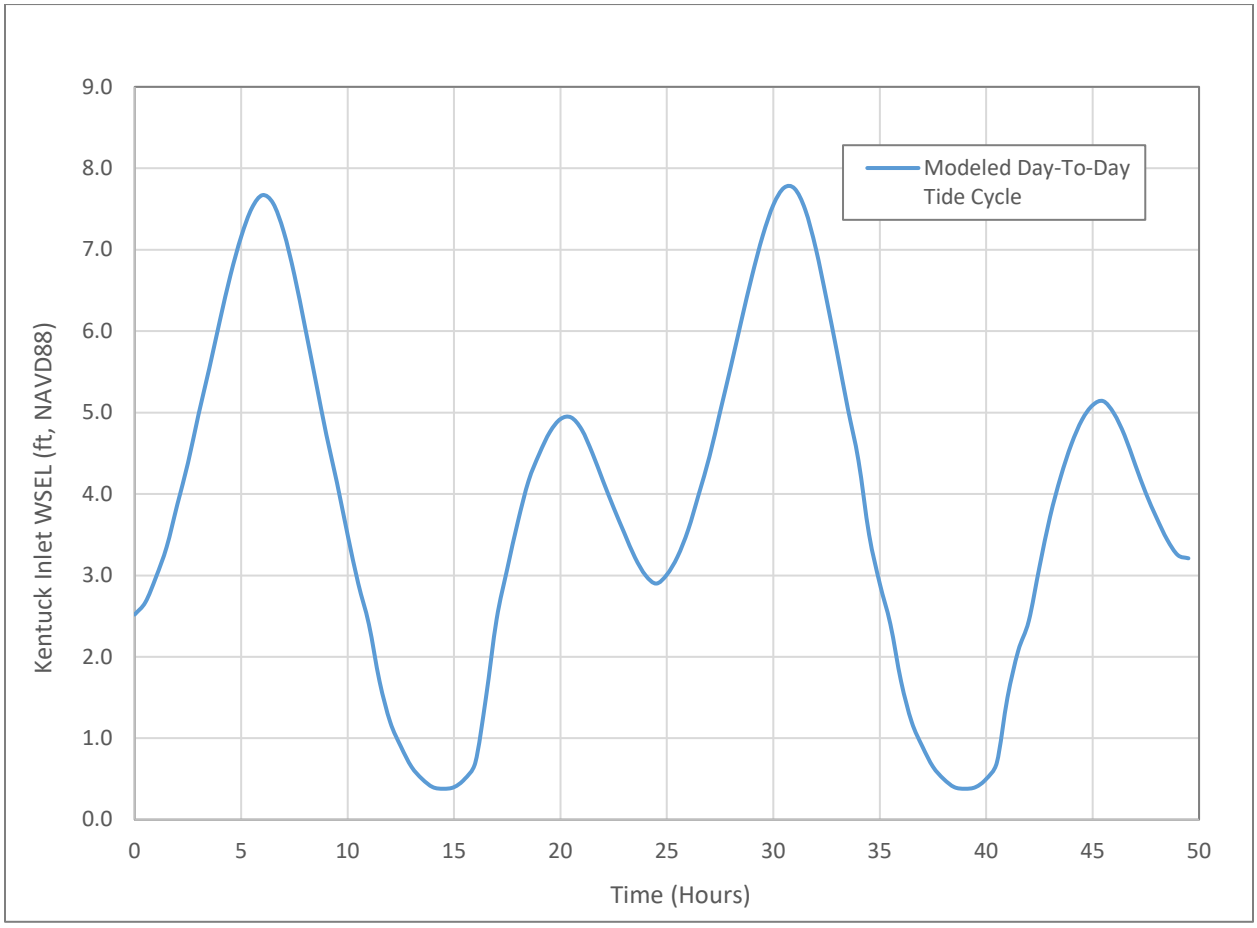


Figure 3 – Modeled Day-to-Day Tide Cycle

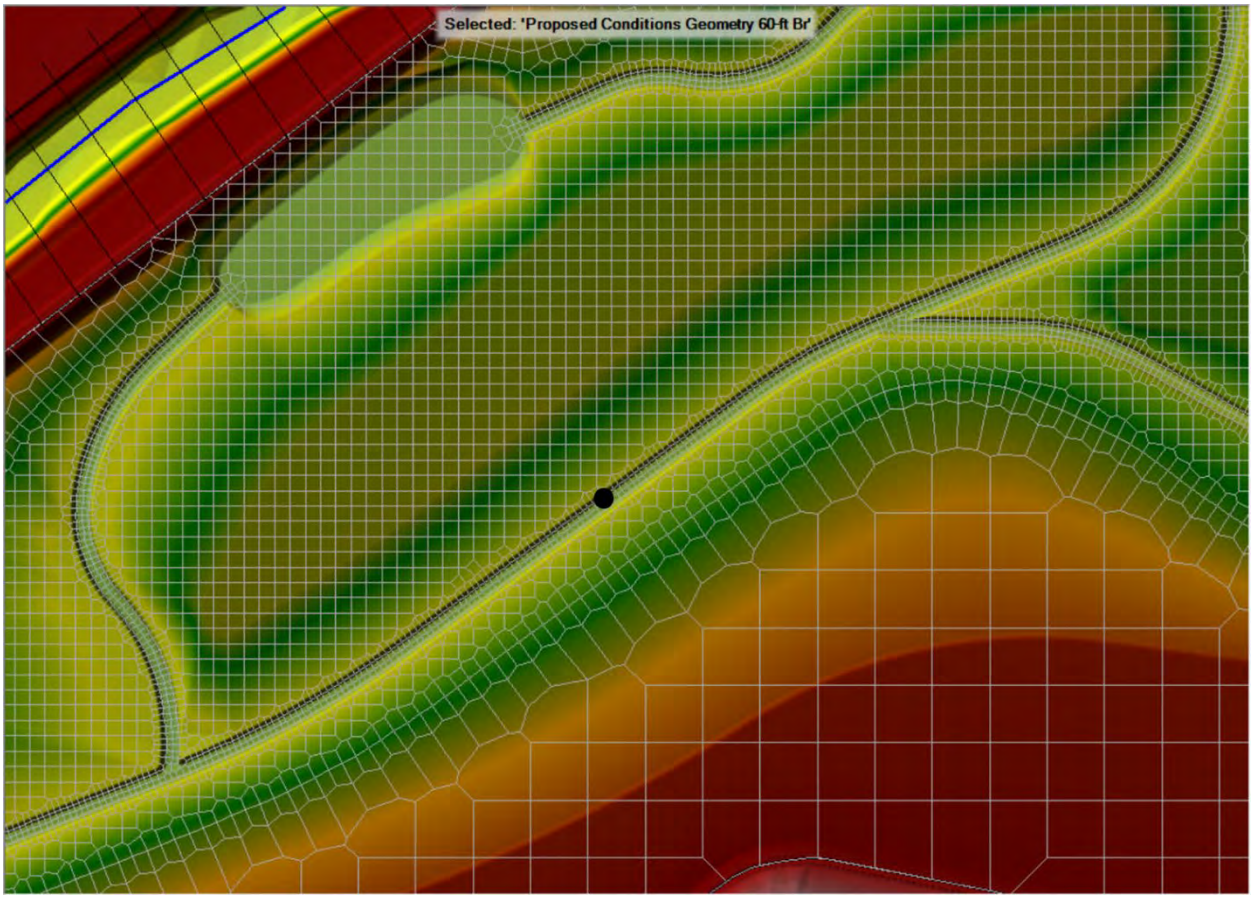


Figure 4 - Representative Lower Mitigation Site Tidal Channel Geometry Detail - Location 1

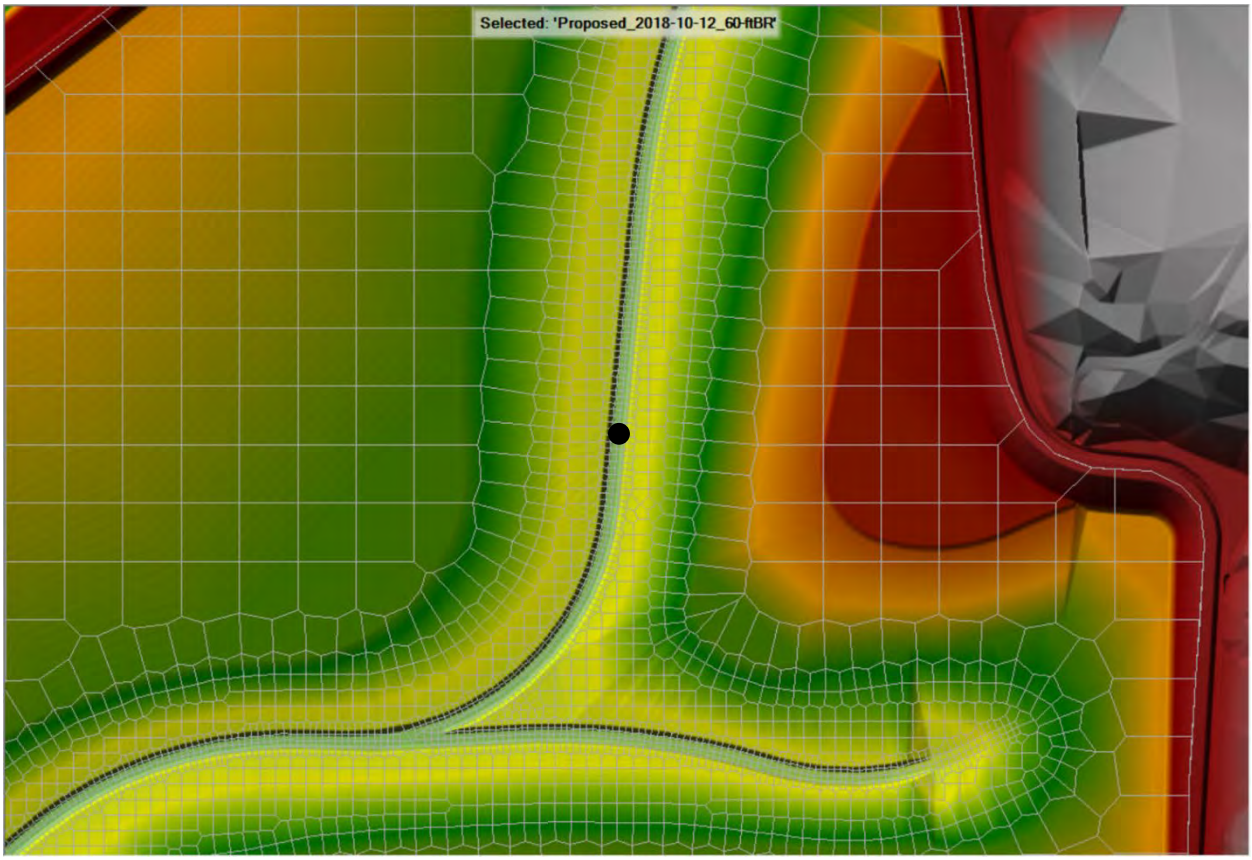


Figure 5 - Prepresentative Lower Mitigation Site Tidal Channel Geometry Detail - Location 2

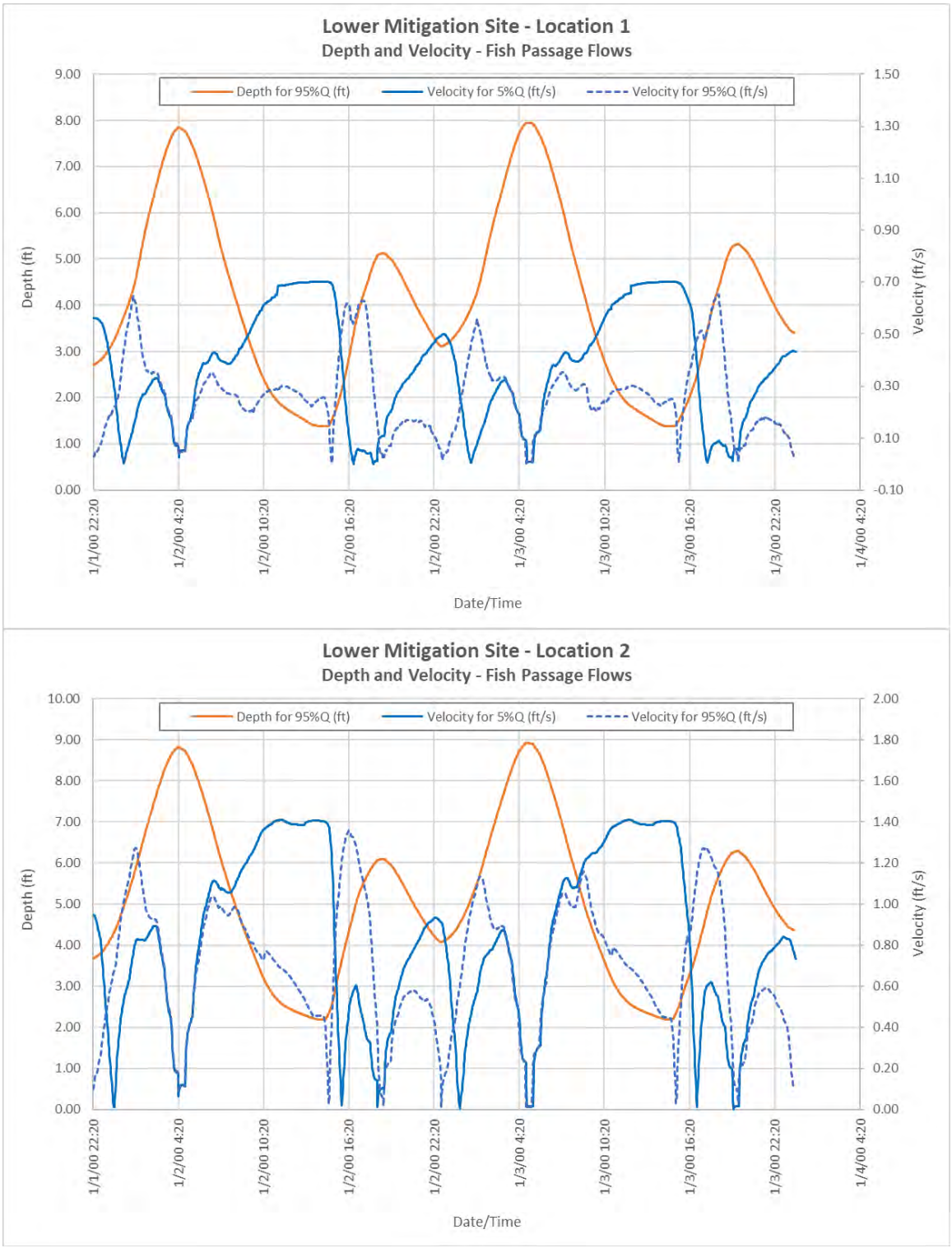


Figure 6 – Velocity and Depth for Lower Mitigation Site Tidal Channel Locations

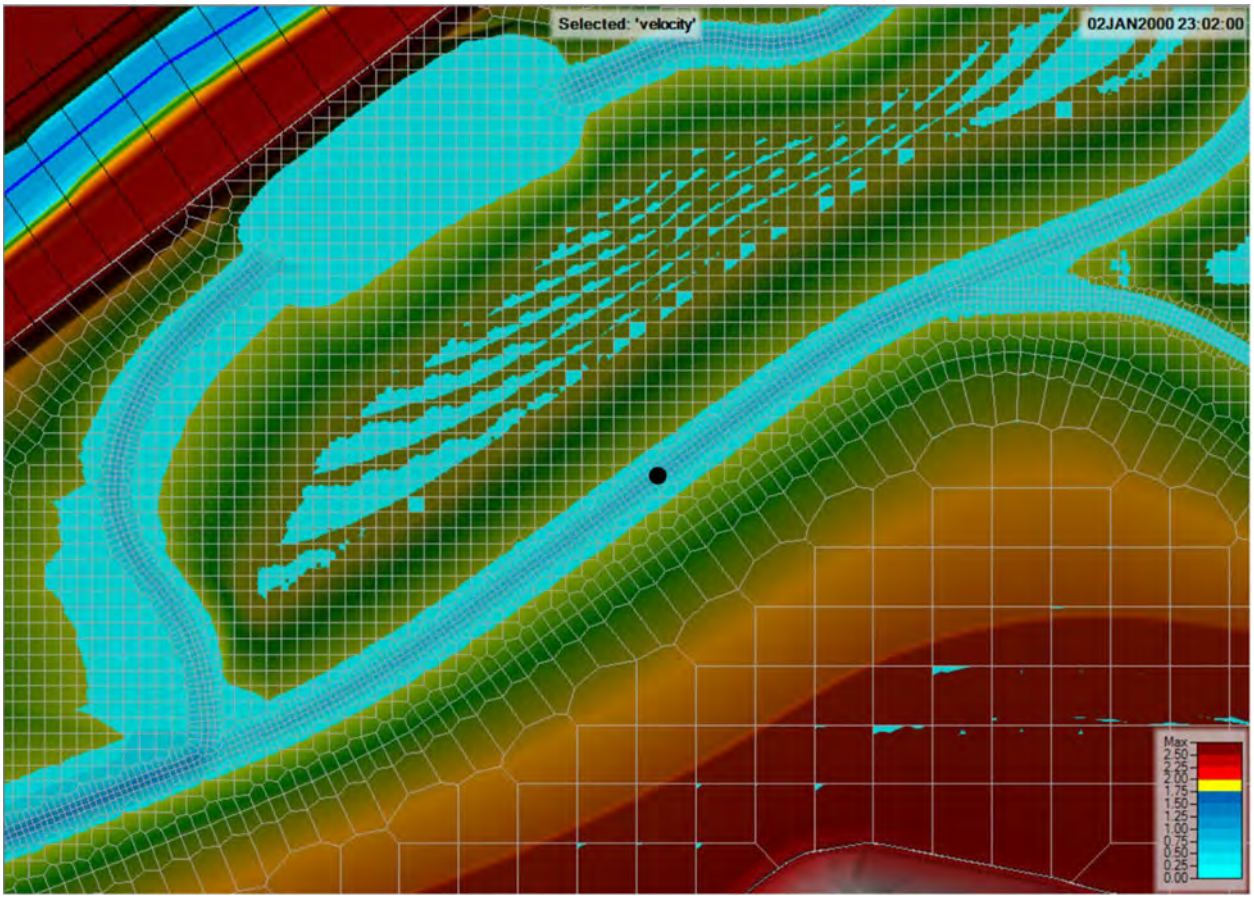


Figure 7 – Maximum Velocity; Lower Mitigation Site Tidal Channel Location 1

Note: Velocity for 5% Exceedance Discharge with Day-to-Day Tide.

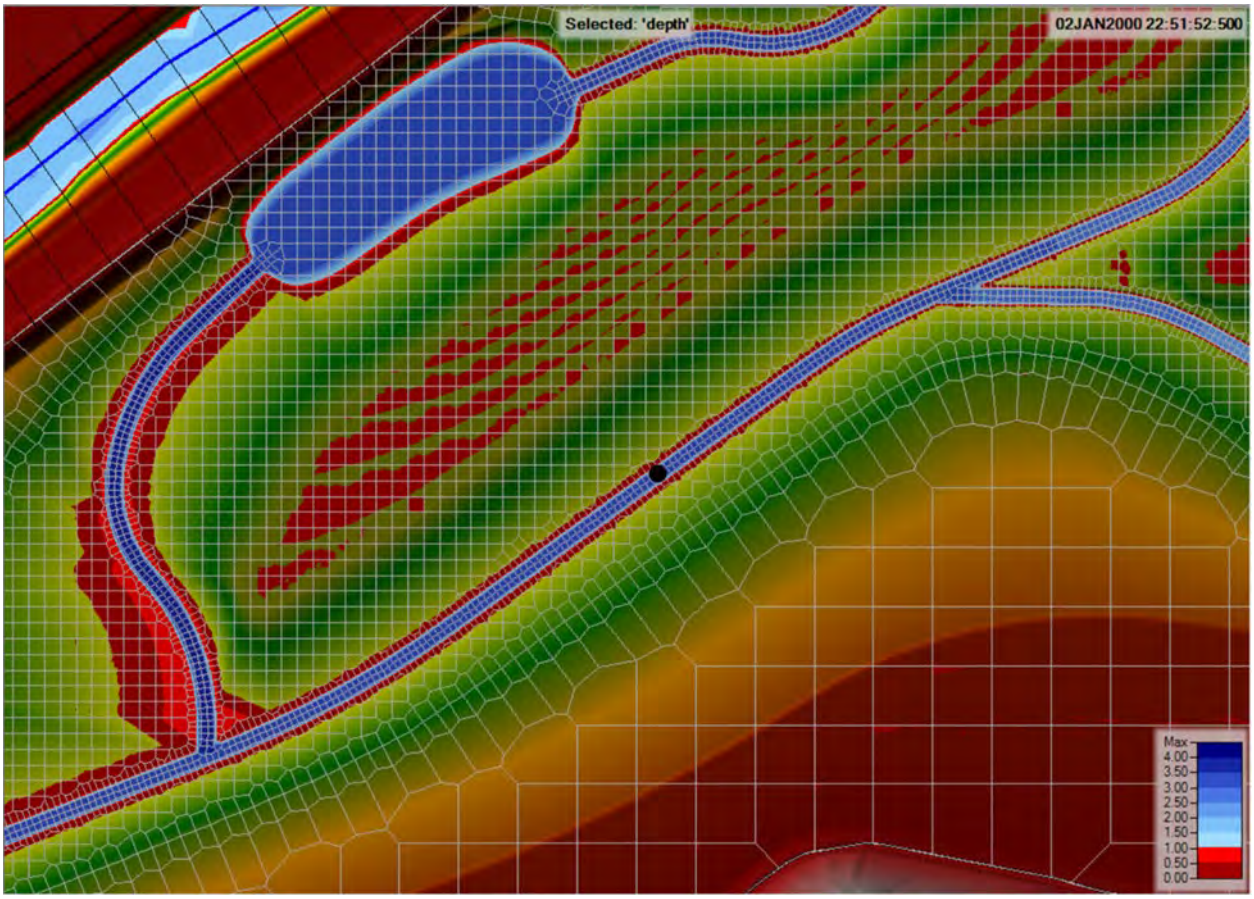


Figure 8 – Minimum Depth; Lower Mitigation Site Tidal Channel Location 1

Note: Depth for 95% Exceedance Discharge with Day-to-Day Tide.

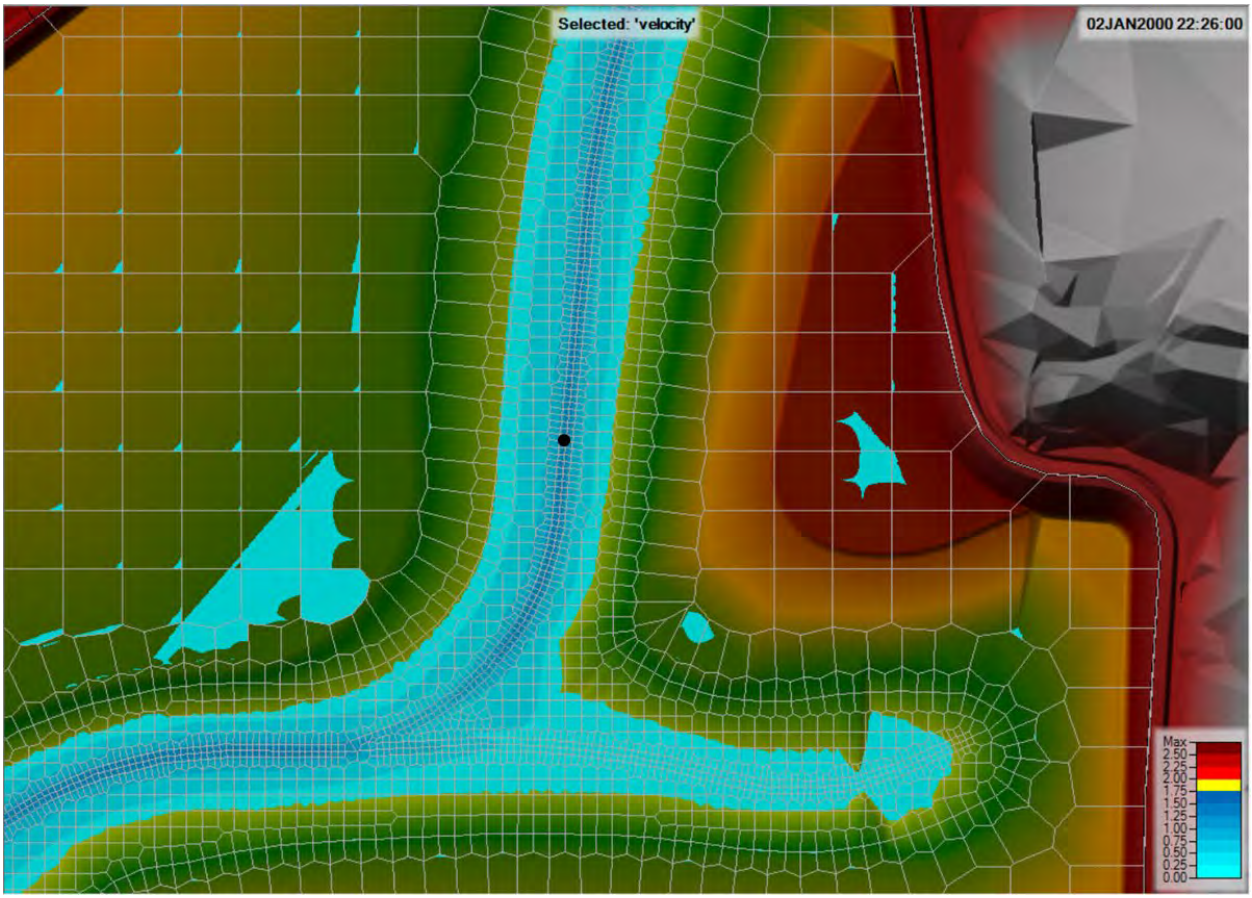


Figure 9 - Maximum Velocity; Lower Mitigation Site Tidal Channel Location 2

Note: Velocity for 5% Exceedance Discharge with Day-to-Day Tide.

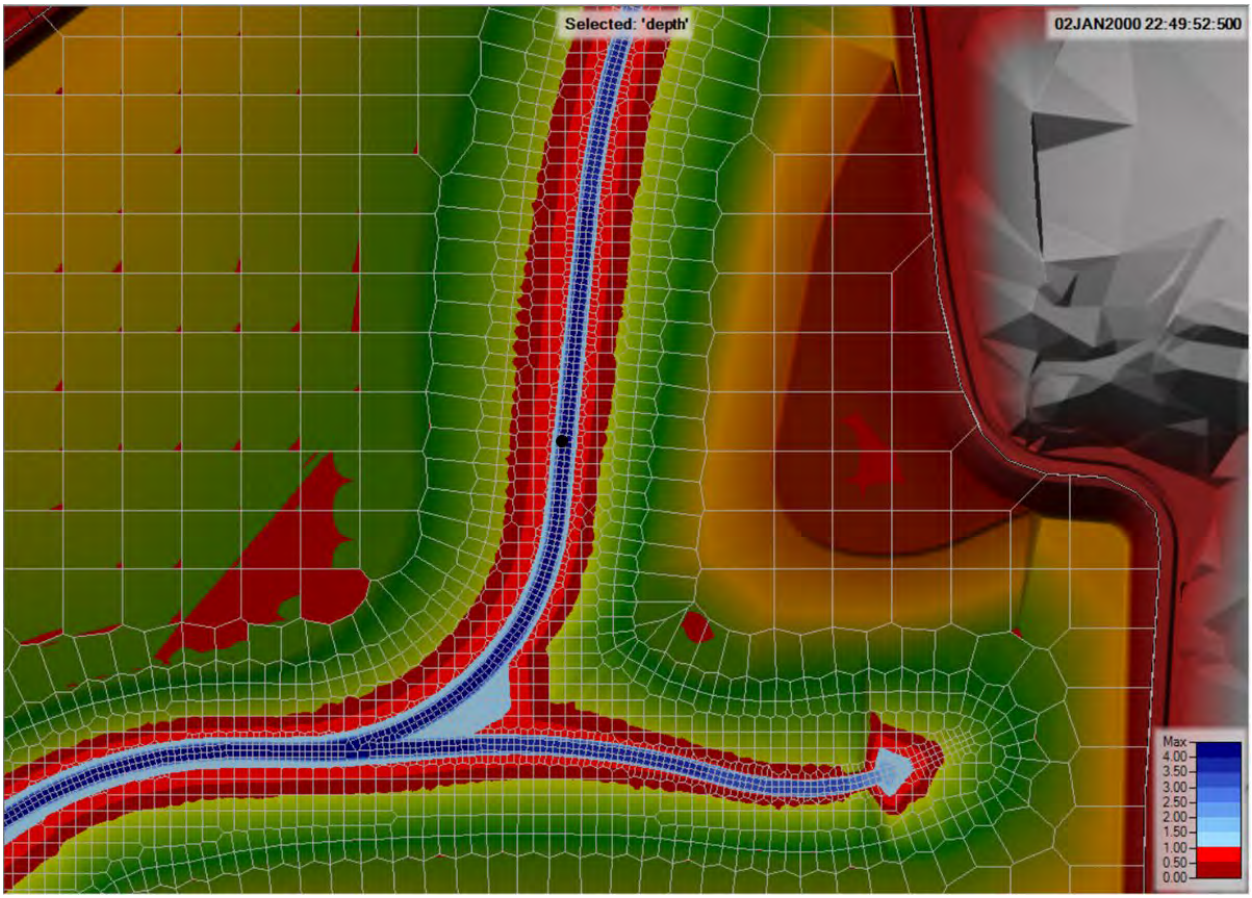


Figure 10 - Minimum Depth; Lower Mitigation Site Tidal Channel Location 2

Note: Depth for 95% Exceedance Discharge with Day-to-Day Tide.

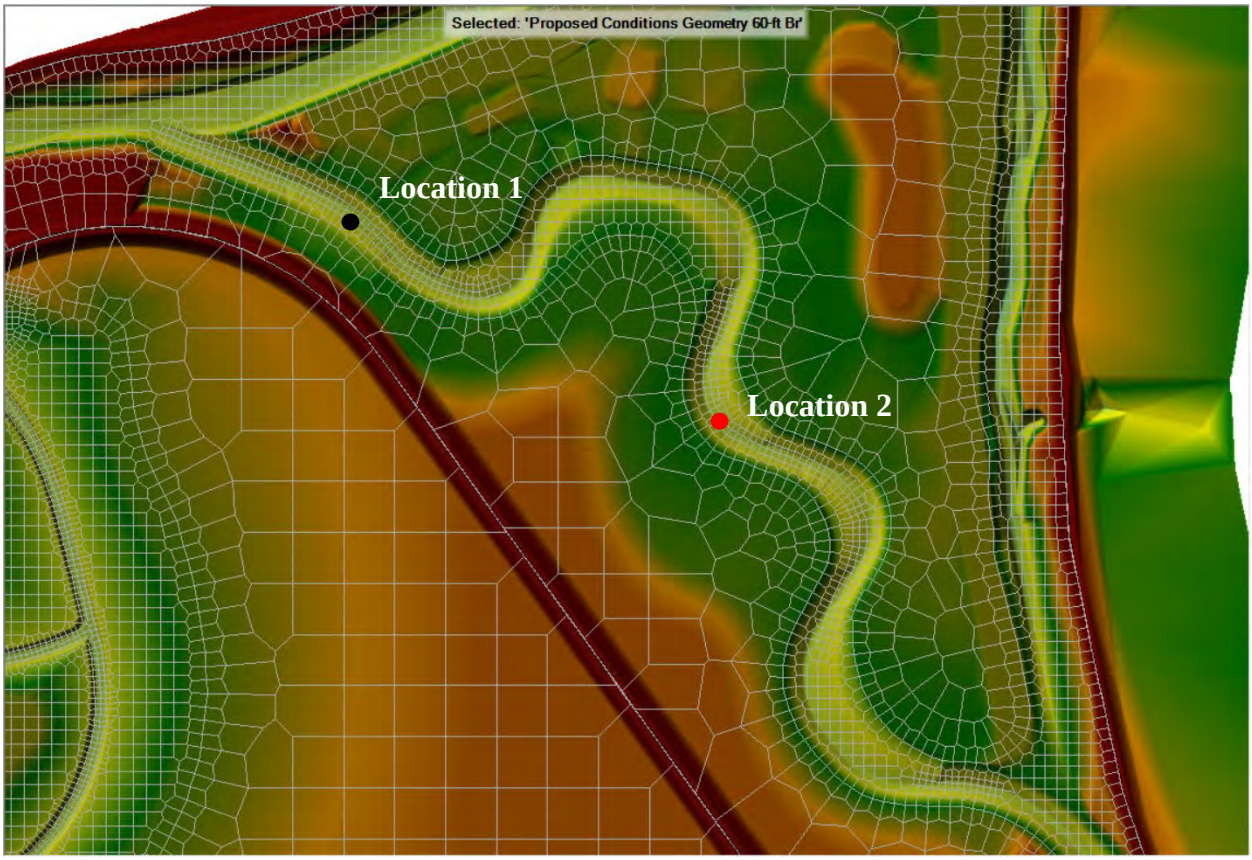


Figure 11 – Representative Fresh Water Site Locations Geometry Detail

Note: velocities and depths for fish passage evaluation extracted at black and red dots

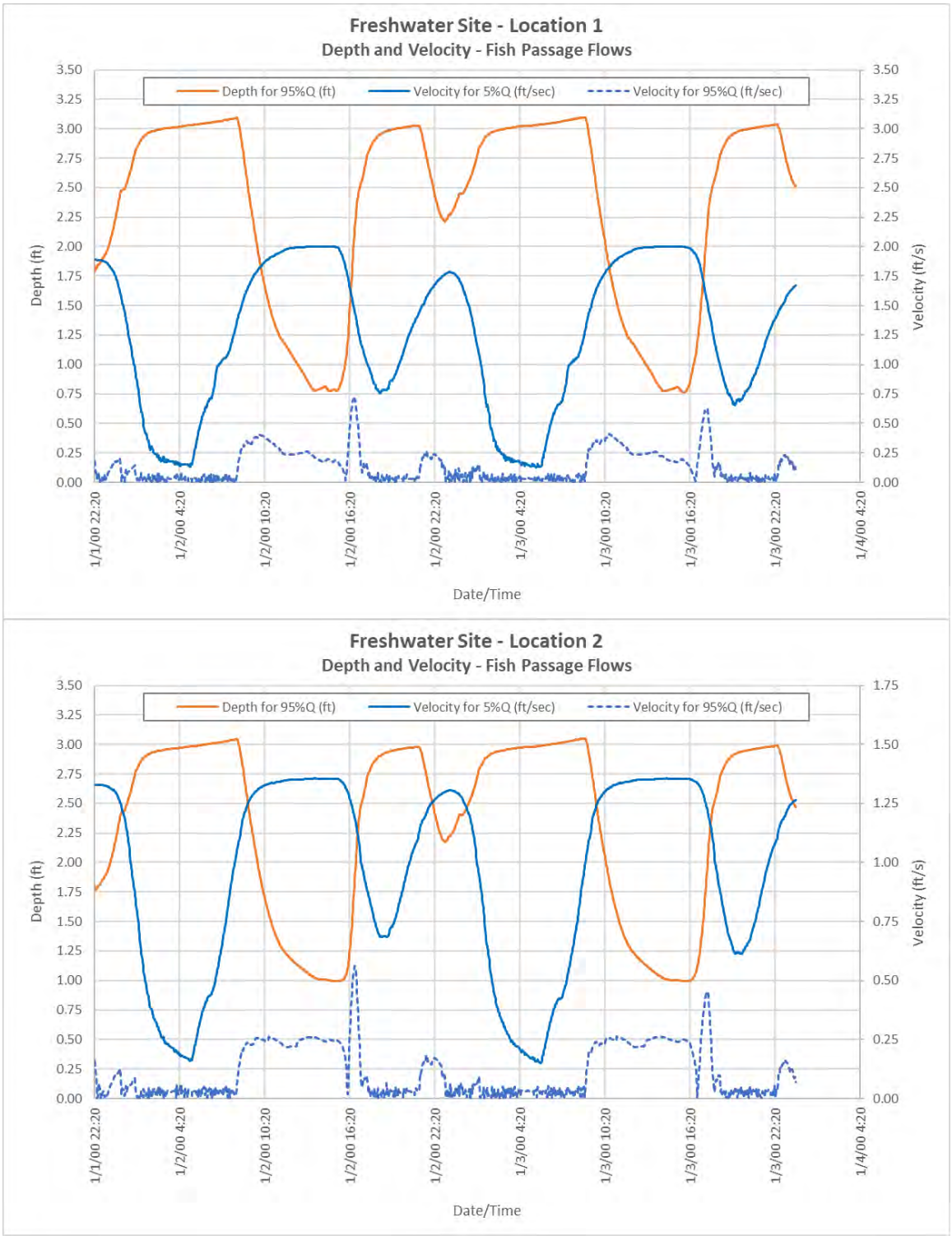


Figure 12 – Velocity and Depth for Fresh Water Site Channel

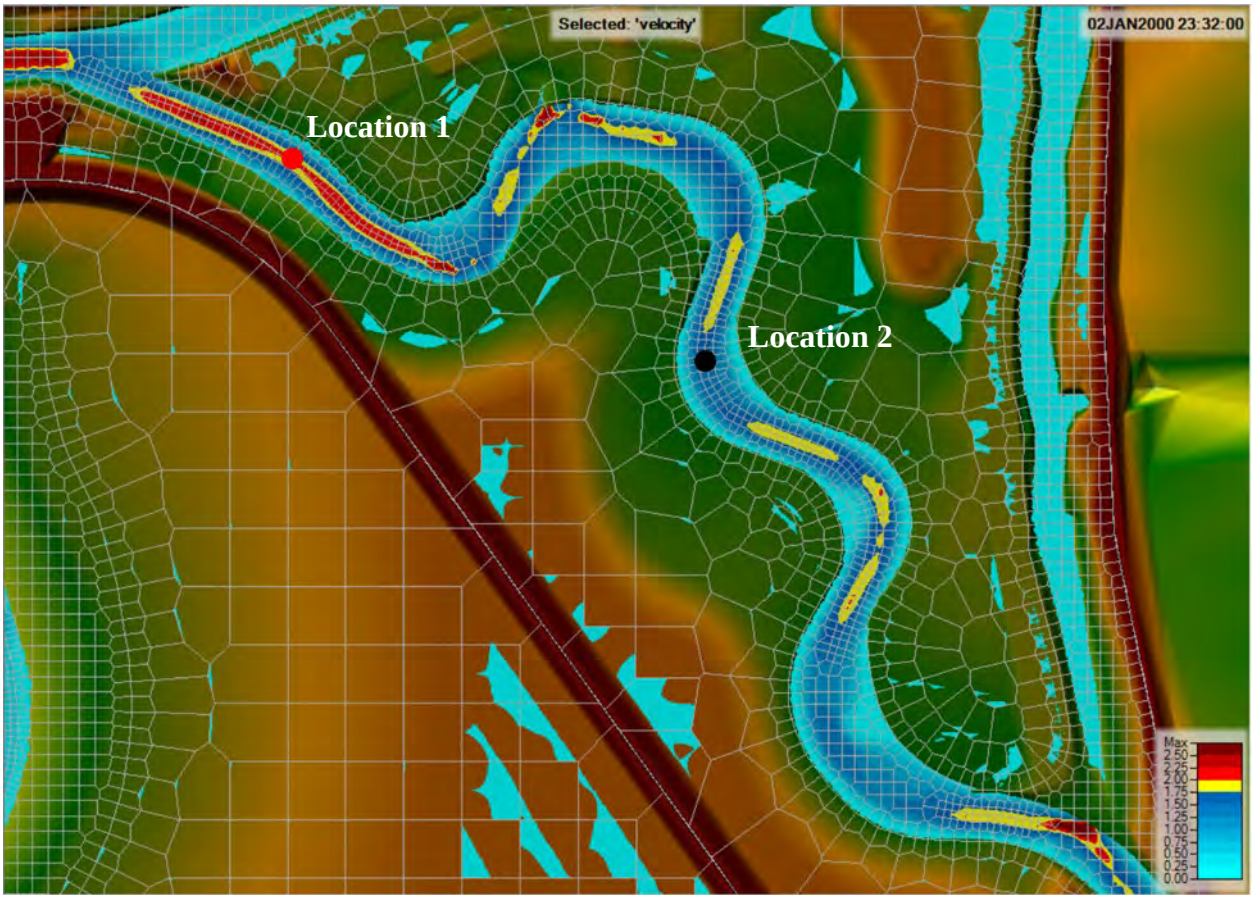


Figure 13 – Maximum Velocity; Fresh Water Site Channel Locations

Note: Velocity for 5% Exceedance Discharge with Day-to-Day Tide.

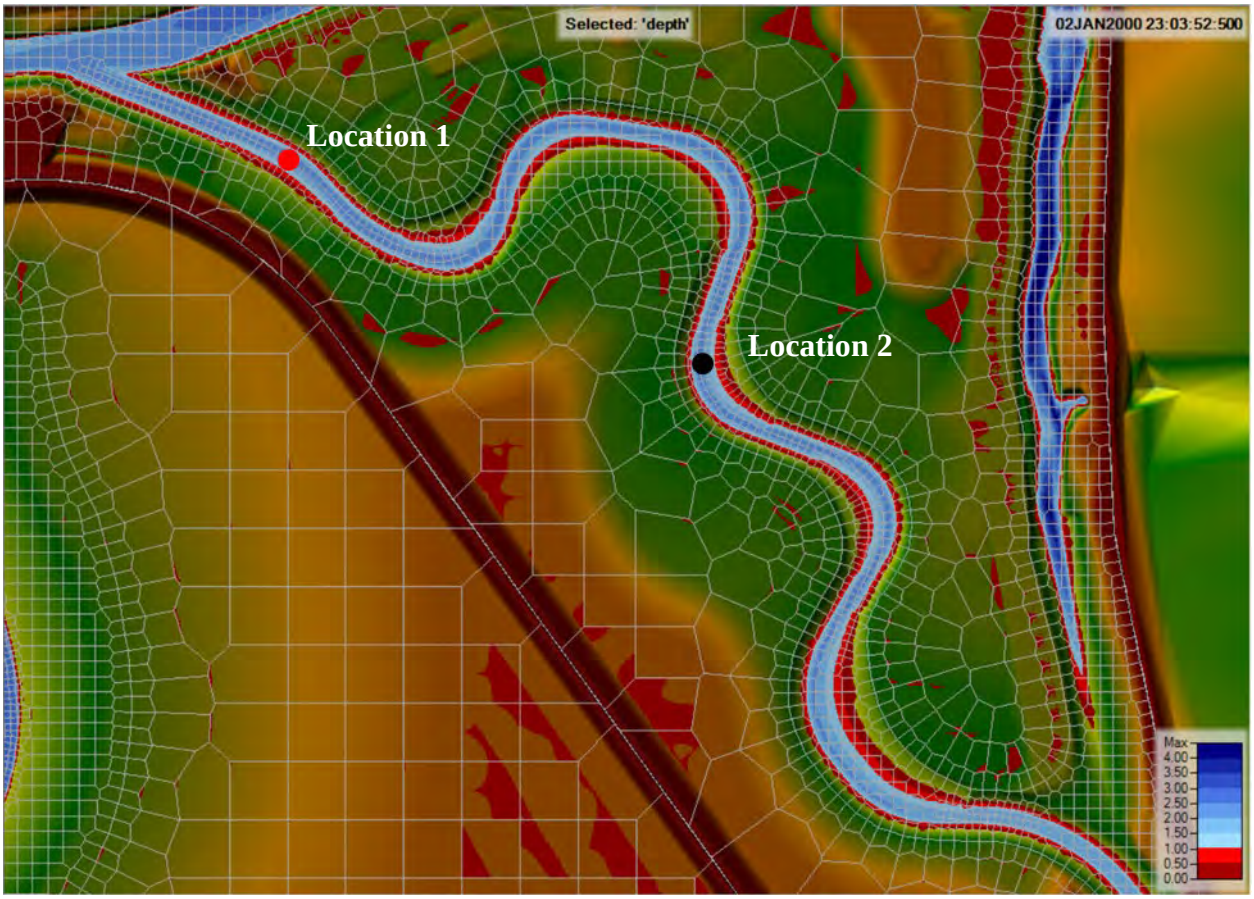


Figure 14 – Minimum Depth; Fresh Water Site Channel Locations

Note: Depth for 95% Exceedance Discharge with Day-to-Day Tide.

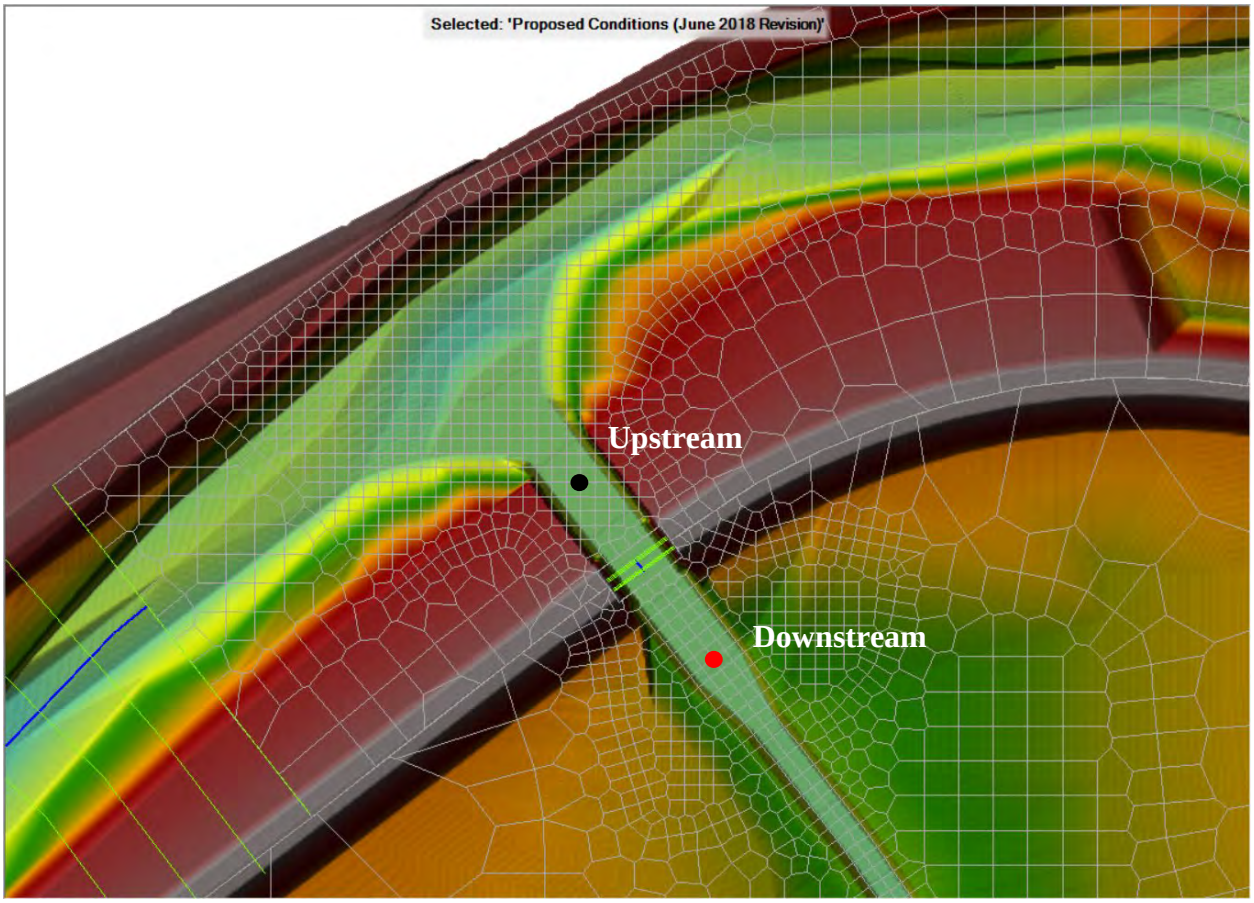


Figure 15 – Proposed MTR Structure Area Detail

Note: velocities and depths for fish passage evaluation extracted at black and red dots. Upstream of MTR Structure is at black dot; downstream is at red dot.

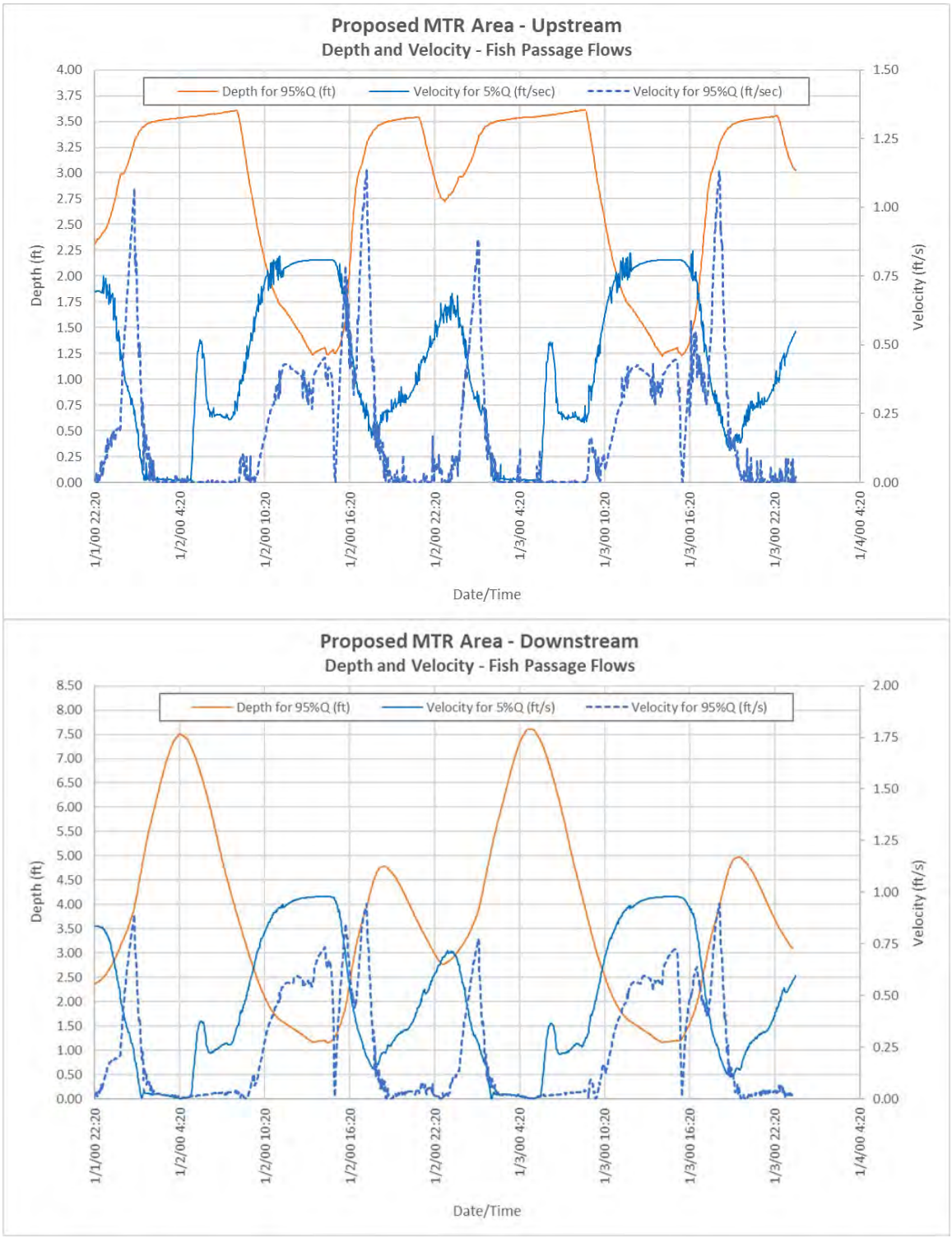


Figure 16 – Velocity and Depth for Proposed MTR Structure Area (Immediately Upstream and Downstream Structure)

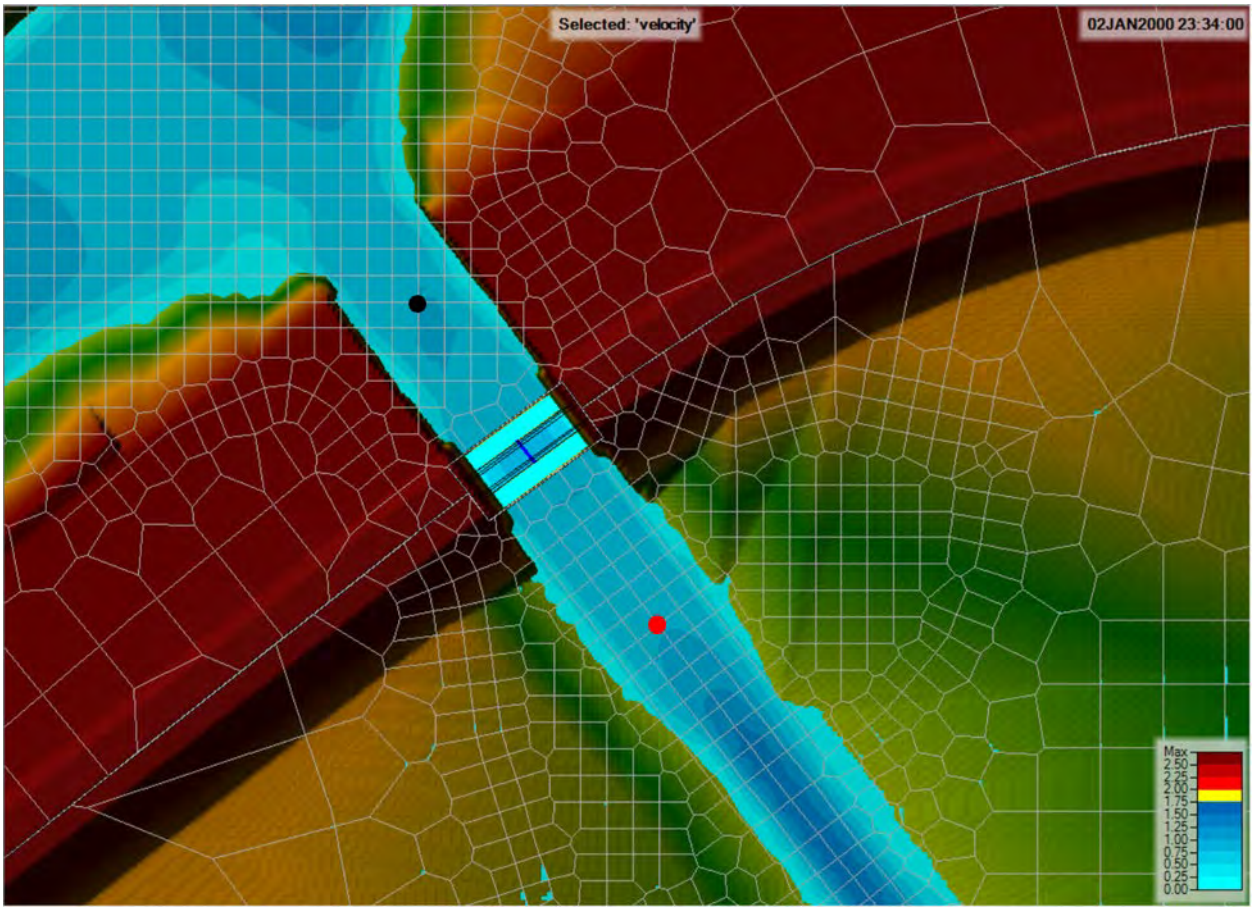


Figure 17 – Maximum Velocity; Proposed MTR Structure Area

Note: Velocity for 5% Exceedance Discharge with Day-to-Day Tide.

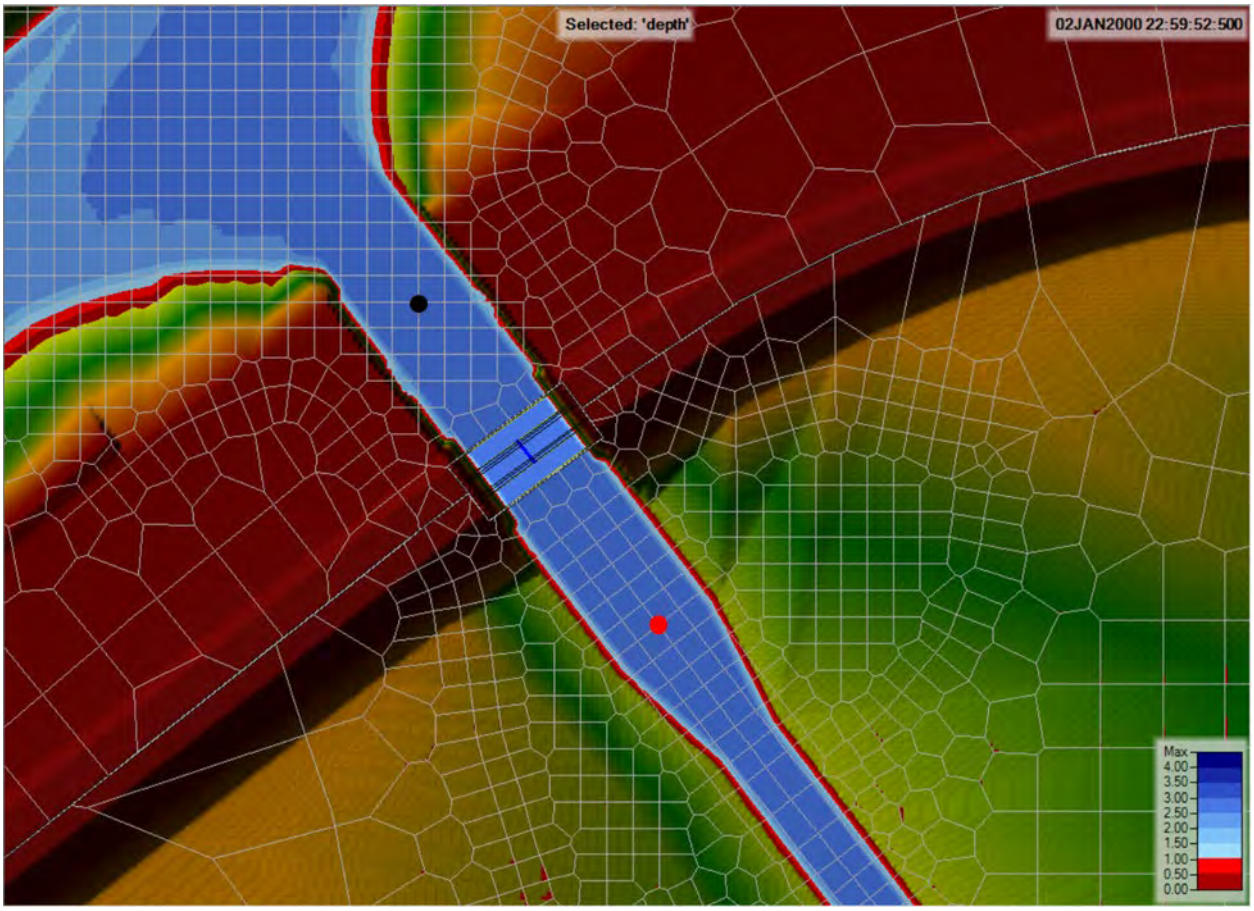


Figure 18 – Minimum Depth; Proposed MTR Structure Area

Note: Depth for 95% Exceedance Discharge with Day-to-Day Tide.

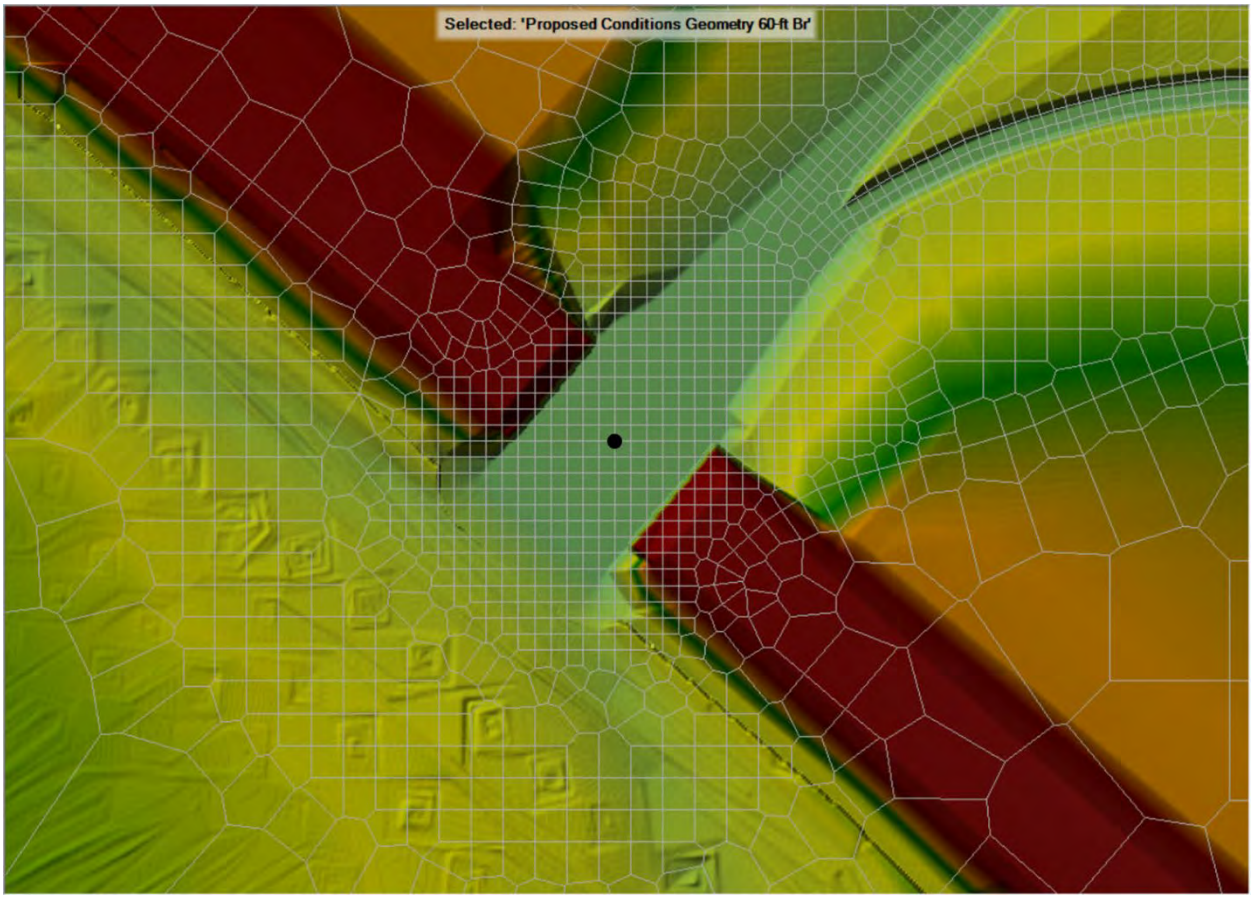


Figure 19 – East Bay Road Bridge Opening Geometry Detail

Note: velocities and depths for fish passage evaluation extracted at black dot.

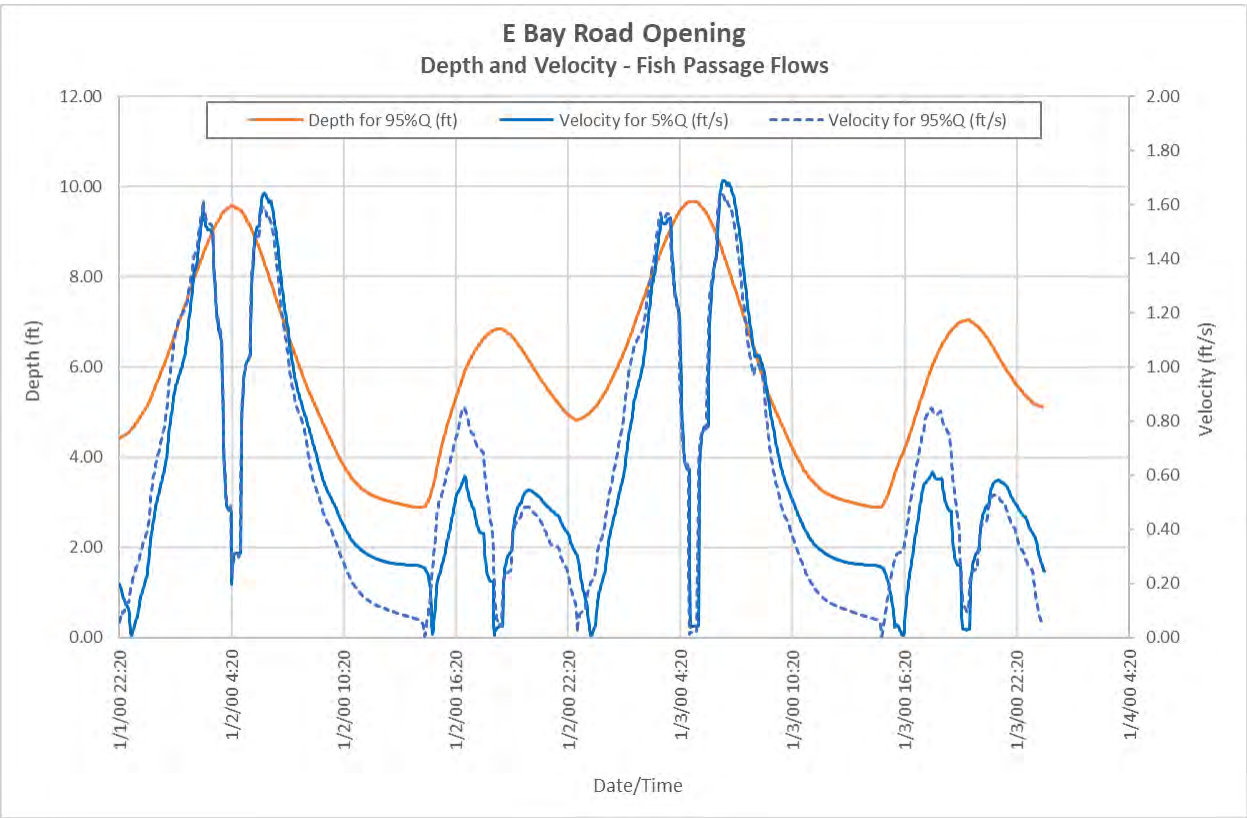


Figure 20 – Velocity and Depth for East Bay Road Bridge Opening

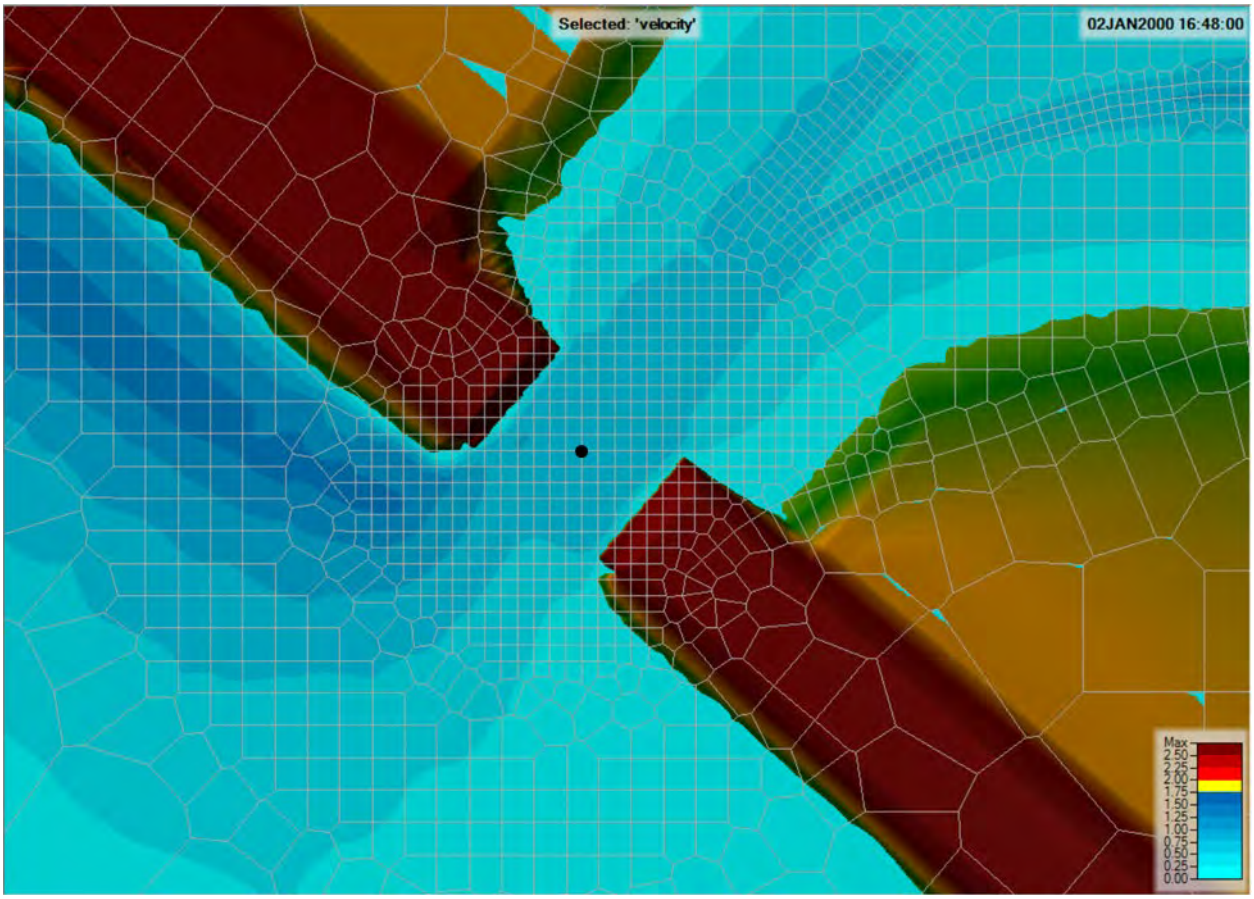


Figure 21 – Maximum Velocity; East Bay Road Opening

Note: Velocity for 5% Exceedance Discharge with Day-to-Day Tide.

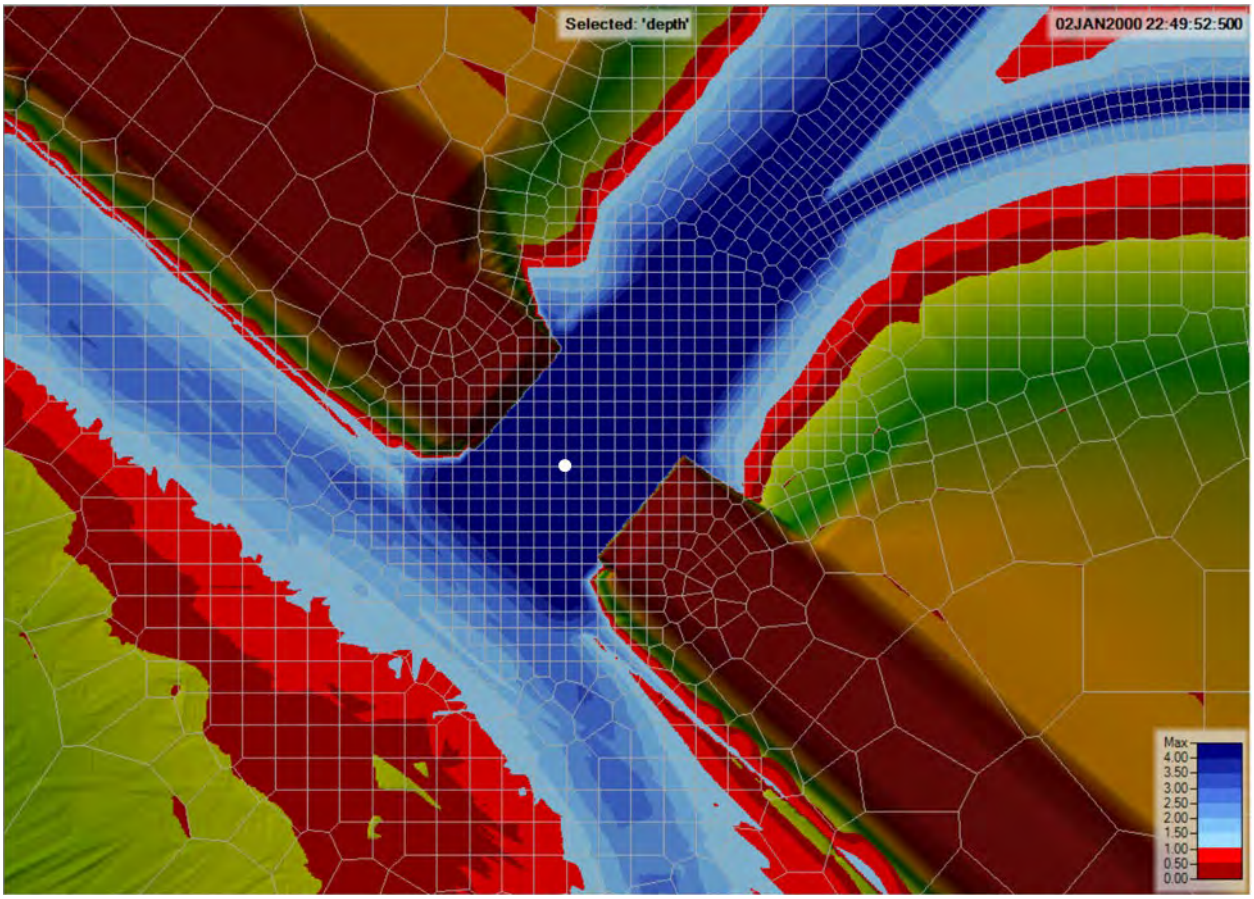
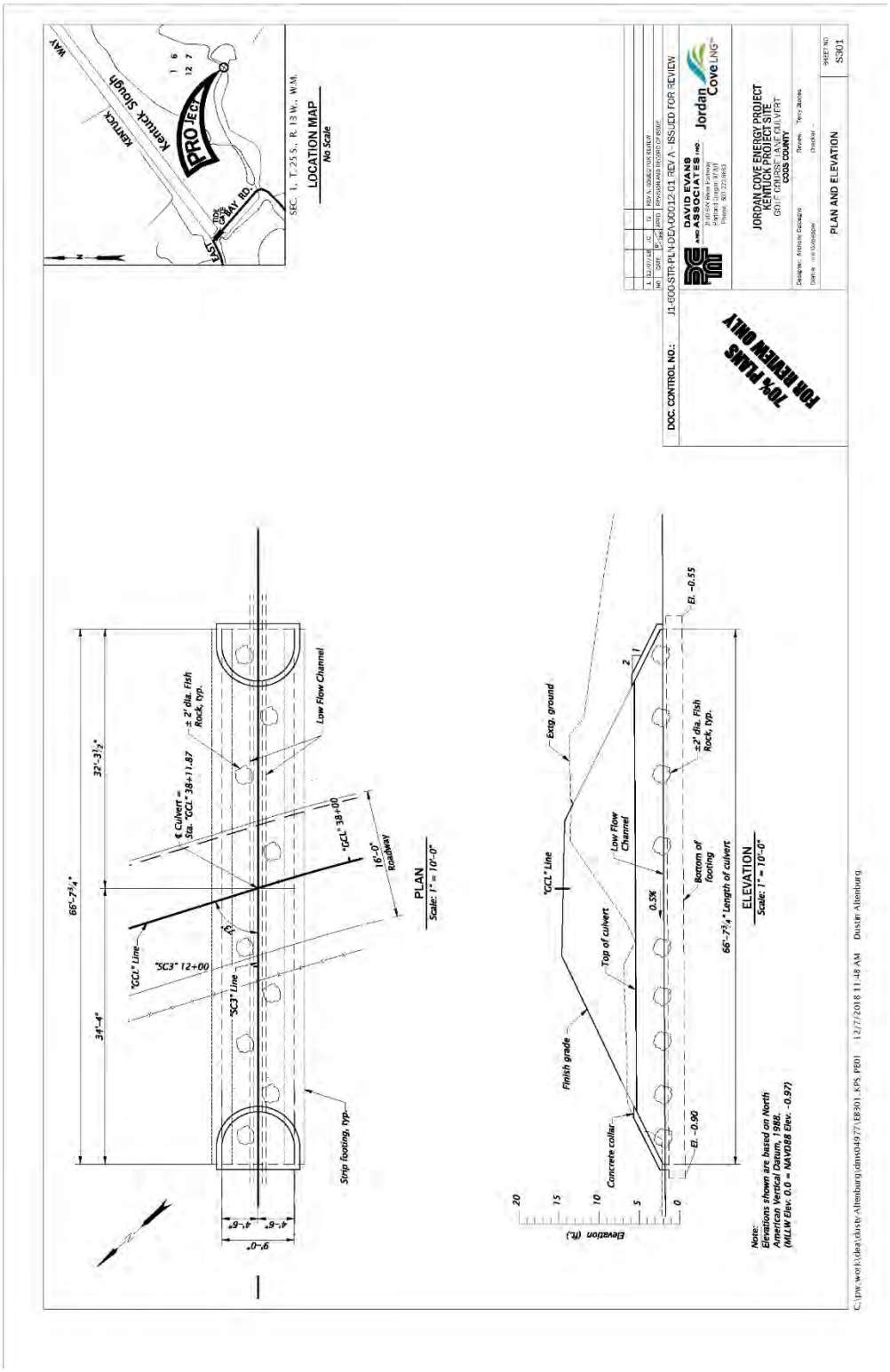


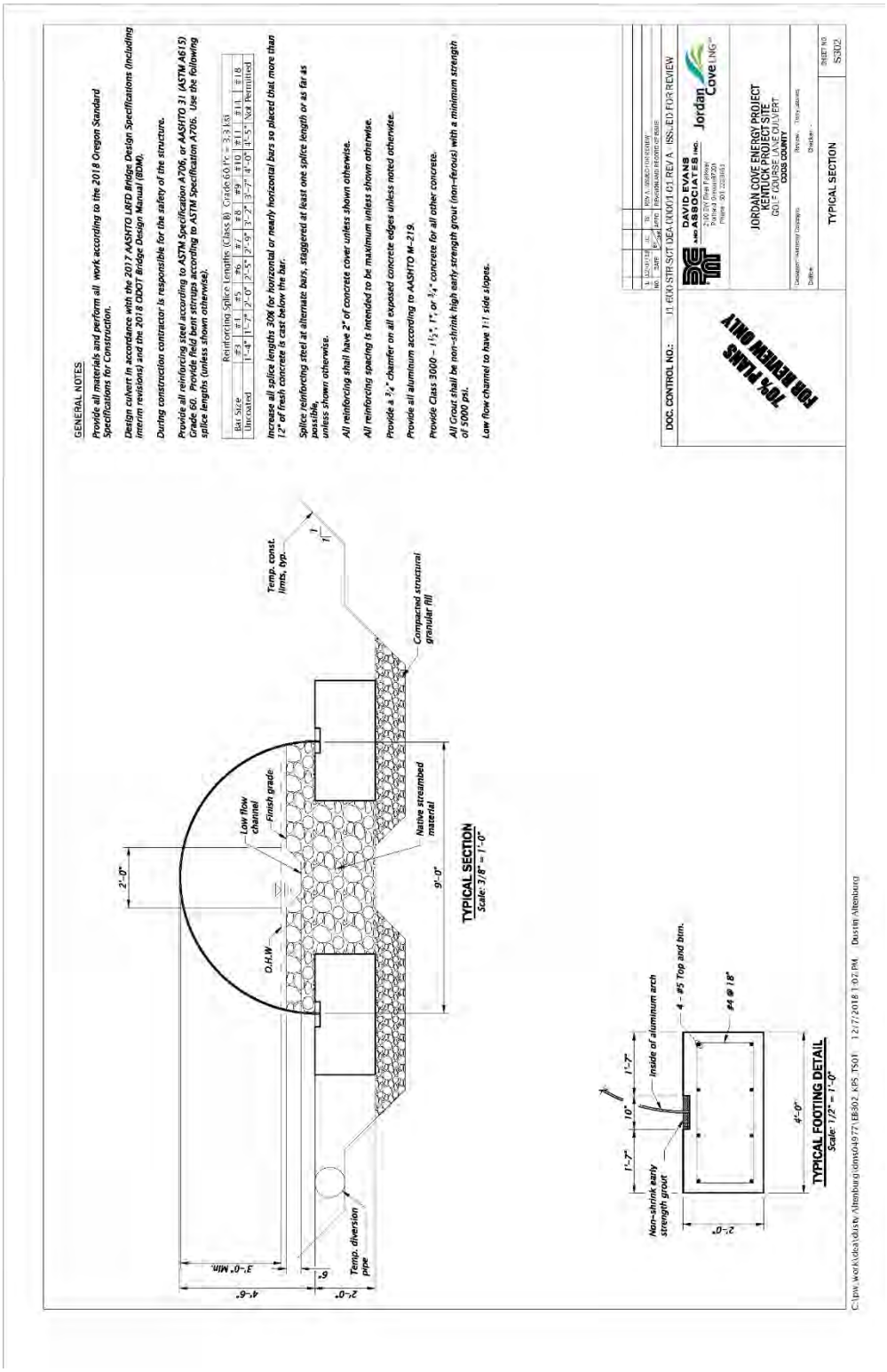
Figure 22 – Minimum Depth; East Bay Road Opening

Note: Depth for 95% Exceedance Discharge with Day-to-Day Tide.

APPENDIX B: PROPOSED GOLF COURSE LANE CULVERT DESIGN PLAN

	Kentuck Project Site	
Jordan Cove LNG	Document Number: J1-600-CIV-RPT-00002-00	WEST Consultants, Inc.
	Rev.: 0	Rev. Date: February 20, 2019




GENERAL NOTES
Provide all materials and perform all work according to the 2018 Oregon Standard Specifications for Construction.
Design culvert in accordance with the 2017 AASHTO LRFD Bridge Design Specifications (including interim revisions) and the 2018 ODOT Bridge Design Manual (BDM).
During construction contractor is responsible for the safety of the structure.
Provide all reinforcing steel according to ASTM Specification A706, or AASHTO 31 (ASTM A615) Grade 60. Provide field bent stirrups according to ASTM Specification A706. Use the following splice lengths (unless shown otherwise).
Reinforcing Splice Lengths (Class B) Grade 60 f'c = 3-3 ksi
Bar Size | #3 | #4 | #5 | #6 | #7 | #8 | #9 | #10 | #11 | #18
Uncoated | 1'-4" | 1'-7" | 2'-0" | 2'-5" | 2'-9" | 3'-2" | 3'-7" | 4'-0" | 4'-5" | Not Permitted
Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12" of fresh concrete is cast below the bar.
Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.
All reinforcing shall have 2" of concrete cover unless shown otherwise.
All reinforcing spacing is intended to be maximum unless shown otherwise.
Provide a 3/4" chamfer on all exposed concrete edges unless noted otherwise.
Provide all aluminum according to AASHTO M-219.
Provide Class 3000 – 1 1/2", 1", or 3/4" concrete for all other concrete.
All Grout shall be non-shrink high early strength grout (non-ferrous) with a minimum strength of 5000 psi.
Low flow channel to have 1:1 side slopes.
DOC. CONTROL NO.: J1-EXO-STR-SUT-DEA-00001-01 REV A ISSUED FOR REVIEW
DAVID EVANS AND ASSOCIATES INC.
Jordan Cove LNG
JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE
COOS COUNTY
TYPICAL SECTION
SHEET NO. S302
TYPICAL SECTION
Scale: 3/8" = 1'-0"
Temp. const. limbs, typ.
Compacted structural granular fill
Low flow channel
Finish grade
Native streambed material
O.H.W.
Temp. diversion pipe
2'-0"
9'-0"
3'-0" Min.
4'-6"
2'-0"
6"
TYPICAL FOOTING DETAIL
Scale: 1/2" = 1'-0"
4 - #5 Top and btm.
#4 @ 18"
Inside of aluminum arch
Non-shrink early strength grout
1'-7"
10"
4'-0"
2'-0"
C:\pw\work\dea\dusty.Altenburg\dms04977\EB302_KPS_TS01 12/7/2018 1:02 PM Dustin.Altenburg

APPENDIX C: FISH PASSAGE CRITERIA PER OREGON ADMINISTRATIVE RULES

DIVISION 412

FISH PASSAGE

635-412-0005
Definitions

(1) For the purposes of OAR 635-412-0010 through OAR 635-412-0040 the following definitions shall apply.
(2) "Active channel width" means the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate.
(3) "Artificial obstruction" means any dam, diversion, dike, berm, levee, tide or flood gate, road, culvert or other human-made device placed in the waters of this state that precludes or prevents the migration of native migratory fish.
(4) "Attraction flow" means the flow that emanates from or near a fishway entrance in sufficient quantity, velocity, and location to attract upstream migrants into the fishway, which can consist of gravity flow from the fish ladder and auxiliary water system flow added in or near the lower ladder.
(5) "Bankfull elevation" means the point on a stream bank at which overflow into a floodplain begins.
(6) "Bed" or "bed and banks" means the physical container of the waters of this state, bounded on freshwater bodies by the ordinary high water line or bankfull stage, and on bays and estuaries by the limits of the highest measured tide.
(7) "Channel" means a waterway that periodically or continuously contains moving waters of this state and has a definite bed and banks that serve to confine the water.
(8) “Commission” means the Oregon Fish and Wildlife Commission.
(9) "Construction" means:
(a) Original construction;
(b) Major replacement, which includes:
(A) For dams and diversions, excavation or replacement of 30 percent by structure volume of the dam, including periodic or seasonal replacements, unless:
(i) Only checkboards are replaced, or
(ii) Fish passage approval has already been obtained in writing from the Department for expected replacement;
(B) For tide gates and flood gates:
(i) Cumulative replacement of over 50 percent of the gate material; or
(ii) Cumulative removal, fill, replacement, or addition of over 50 percent of the structure supporting the gate, excluding road-stream crossing structures;
(C) For dikes, berms, levees, roads, or other artificial obstructions that segment estuaries, floodplains, or wetlands:
(i) Activities defined under OAR 635-412-0005(9)(d) in all locations where current channels cross the artificial obstruction segmenting the estuary, floodplain, or wetland; or
(ii) The cumulative removal, fill, replacement, or addition of over 50 percent by volume of the existing material directly above an historic channel or historically-inundated area; and
(D) For other artificial obstructions, the cumulative removal, fill, replacement, or addition of over 50 percent of the structure comprising the artificial obstruction to native migratory fish migration;
(c) Structural modifications that increase storage or diversion capacity; or
(d) For purposes of culverts, installation or replacement of a roadbed or culvert, further defined as:
(A) Roadbed installation or replacement at culverts includes any activity that:
(i) Creates a road which crosses a channel;
(ii) Widens a roadfill footprint within a channel; or
(iii) Fills or removes over 50 percent by volume of the existing roadbed material directly above a culvert, except when this volume is exclusively composed of the top 1 foot of roadbed material;
(B) Culvert installation or replacement includes any activity that:
(i) Installs or constructs a new culvert, overflow pipe, apron, or wingwall within a channel;

(ii) Extends existing culverts, aprons, or wingwalls within a channel, except one-time placements of culvert ends which do not extend greater than 1 foot beyond the adjacent road footprint in place prior to August 2001;

(iii) Cumulatively through time makes significant repairs or patches to over 50 percent of the linear length of a culvert;

(iv) Replaces any part of a culvert, except ends which become misaligned or eroded and which are replaced to their original configuration;

(v) At any point along the linear length of a culvert, reduces the entire inside perimeter of the culvert; or

(vi) Makes replacements, repairs, patches, or modifications to an existing culvert that are different than the original configuration and which reduce any level of fish passage for native migratory fish with current access, as determined by the Department, to the culvert.

(10) "Dam" means a structure, or group of structures with different functions, spanning or partially-spanning a stream in one location in order to pool water, facilitate the diversion of water, or raise the water surface elevation.

(11) "Department" means the Oregon Department of Fish and Wildlife.

(12) “Director” means the Director of the Oregon Department of Fish and Wildlife.

(13) "Design streamflow range" means the range of flows within a stream, bracketed by the Low Fish Passage Design Flow and the High Fish Passage Design Flow, for which a fishway shall provide fish passage.

(14) "Emergency" means unforeseen circumstances materially related to or affected by an artificial obstruction that, because of adverse impacts to a population of native migratory fish, requires immediate action.

(15) "Estuary" means a body of water semi-enclosed by land and connected with the open ocean within which salt water is usually diluted by fresh water derived from the land. "Estuary" includes all estuarine waters, tidelands, tidal marshes and submerged lands extending upstream to the head of tidewater. However, for the purposes of these rules, the Columbia River Estuary extends to the western edge of Puget Island.

(16) "Exclusion barrier" means a structure placed that prevents fish passage for the benefit of native migratory fish.

(17) "Experimental fish passage structure" means a fish passage structure based on new ideas, new technology, or unique, site-specific conditions determined by the Department to not be covered by existing fish passage criteria but to have a reasonable possibility of providing fish passage.

(18) "Fish passage" means the ability, by the weakest native migratory fish and life history stages determined by the Department to require passage at the site, to move volitionally, with minimal stress, and without physical or physiological injury upstream and downstream of an artificial obstruction.

(19) "Fish passage structure" means any human-built structure that allows fish passage past an artificial obstruction, including, but not limited to, fishways and road-stream crossing structures such as culverts and bridges.

(20) "Fishway" means the set of human-built and/or operated facilities, structures, devices, and measures that together constitute, are critical to the success of, and were created for the sole purpose of providing upstream fish passage at artificial or natural obstructions which create a discontinuity between upstream and downstream water or bed surface elevations.

(21) "Fishway entrance" means the component of a fishway that discharges attraction flow into the tailrace and where upstream migrant fish enter the fishway.

(22) "Fishway pools" means discrete sections within a fishway separated by overflow weirs or non-overflow walls that create incremental water surface elevation gains and dissipate energy.

(23) "Floodplain" means that portion of a river valley, adjacent to the channel, which is built of sediments deposited during the present regimen of the stream and which is covered with water when the waterway overflows its banks at flood stage.

(24) "Forebay" means the water impounded immediately upstream of an artificial obstruction.

(25) "Fundamental change in permit status" means a change in regulatory approval for the operation of an artificial obstruction where the regulatory agency has discretion to impose additional conditions on the applicant, including but not limited to licensing, relicensing, reauthorization or the granting of new water rights, but not including water right transfers or routine maintenance permits unless they involve construction or abandonment of an artificial obstruction.
(26) "High fish passage design flow" means the mean daily average stream discharge that is exceeded 5 percent of the time during the period when the Department determines that native migratory fish require fish passage.
(27) "Historically" means prior to 1859 (statehood).
(28) "Inflow" means surface movement of waters of this state from a lower ground surface elevation to a higher ground surface elevation or away from the ocean.
(29) "In-proximity" means within the same watershed or water basin, as defined by the Oregon Water Resources Department, and having the highest likelihood of benefiting the native migratory fish populations, as defined by the Oregon Department of Fish and Wildlife, directly affected by an artificial obstruction.
(30) "Low fish passage design flow" means the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when the Department determines that native migratory fish require fish passage.
(31) "Mitigation" means alternatives to providing fish passage at an artificial obstruction as per ORS 509.585.
(32) "Native migratory fish" means native fish (as defined under OAR 635-007-0501) that migrate for their life cycle needs. These fish include all sub-species and life history patterns of the following species listed by scientific name in use as of 2005. Common names are provided for reference but are not intended to be a complete listing of common names, sub-species, or life history patterns for each species.

(a) Acipenser medirostris ….. Green Sturgeon
(b) Acipenser transmontanus ….. White Sturgeon
(c) Amphistichus rhodoterus ….. Redtail surfperch
(d) Catostomus columbianus ….. Bridgelip sucker
(e) Catostomus luxatus/Deltistes luxatus ….. Lost River sucker
(f) Catostomus macrocheilus ….. Largescale sucker
(g) Catostomus microps ….. Modoc sucker
(h) Catostomus occidentalis ….. Goose Lake sucker
(i) Catostomus platyrhynchus ….. Mountain sucker
(j) Catostomus rimiculus ….. Klamath smallscale sucker
(k) Catostomus snyderi ….. Klamath largescale sucker
(l) Catostomus tahoensis ….. Tahoe sucker
(m)Catostomus warnerensis ….. Warner sucker
(n) Chasmistes brevirostris ….. Shortnose sucker
(o) Hypomesus pretiosus ….. Surf smelt
(p) Lampetra ayresi ….. River lamprey
(q) Lampetra lethophaga ….. Pit-Klamath lamprey
(r) Lampetra minima ….. Miller Lake lamprey
(s) Lampetra similes ….. Klamath River lamprey
(t) Lampetra tridentate ….. Pacific lamprey
(u) Oncorhynchus clarki ….. Coastal, Lahontan and West Slope cutthroat trout
(v) Oncorhynchus keta ….. Chum salmon
(w) Oncorhynchus kisutch ….. Coho salmon
(x) Oncorhynchus mykiss ….. Steelhead, Rainbow and Redband trout
(y) Oncorhynchus nerka ….. Sockeye/Kokanee salmon
(z) Oncorhynchus tshawytscha …..

Chinook salmon (aa) Prosopium williamsoni ….. Mountain whitefish (bb) Ptychocheilus oregonensis ….. Northern pikeminnow (cc) Ptychocheilus umpquae ….. Umpqua pikeminnow (dd) Salvelinus confluentus ….. Bull trout (ee) Spirinchus thaleichthys ….. Longfin smelt (ff) Thaleichthys pacificus ….. Eulachon

(33) "Net benefit" means an increase in the overall, in-proximity habitat quality or quantity that is biologically likely to lead to an increased number of native migratory fish after a development action and any subsequent mitigation measures have been completed.

(34) "Ordinary high water line" (OHWL) means the line on the bank or shore to which the high water ordinarily rises annually in season. (Note: see OAR 141-085-0010 for physical characteristics that can be used to determine the OHWL in the field.)

(35) "Oregon Plan" means the guidance statement and framework described in ORS 541.405.

(36) "Over-crowding" means fish density within a pool's wetted volume is such that there is less than 0.25 cubic feet of water per pound of fish for the maximum number of fish expected to be present within the pool at the same time, as determined by the Department.

(37) "Road" means a cleared or built surface, and associated materials or measures for support and safety, used for the purpose of motorized or non-motorized movement between different locations.

(38) "Roadfill footprint" means the area occupied by soil, aggregate, and/or other materials or structures necessary to support a road, including, but not limited to, appurtenant features such as wing walls, retaining walls, or headwalls.

(39) "Stream" means a body of running waters of this state moving over the surface of the land in a channel or bed including stream types classified as perennial or intermittent and channelized or relocated streams.

(40) "Sub-basin" means a 4th-field hydrologic unit as defined by the U.S. Geological Survey.

(41) "Tailrace" means the water immediately downstream of an instream structure.

(42) "Temporary" means in place less than the in-water work period defined by the Department for a particular location.

(43) "Trap" means the set of human-built and/or operated facilities, structures, devices, and measures that hold fish and prevent them from passing volitionally.

(44) "Unforeseen circumstances" means:

(a) An event that causes an existing human-made structure in the waters of the state which provides fish passage to become an artificial obstruction; or

(b) New fish population information indicating that an existing artificial obstruction is placing a local native migratory fish population in jeopardy.

(45) "Volitionally" means with minimal delay and without being trapped, transferred, or handled by any person, unless specifically allowed under OAR 635-412-0035(6).

(46) "Waters of this state" means natural waterways including all tidal and non-tidal bays, intermittent and perennial streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and non-navigable, including that portion of the Pacific Ocean that is within the boundaries of Oregon.

(47) "Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.580, ORS 509.585, ORS 509.610 and ORS 509.625
Hist.: Adopted 1-6-06, f. & certified ef. 1-9-06

9. 635-412-0010

Fish Passage Task Force

(1) The Director shall appoint nine members to constitute the Fish Passage Task Force.

(2) Three members shall represent interests subject to the obligation to install passage at facilities they install, own or operate; three members shall represent fishing, environmental or conservation interests, and three members shall represent the general public.

(3) Members shall serve four-year terms, and shall be eligible for re-appointment to the task force, except that the initial designation of members shall appoint members of each interest group to a three year, four year or five year term to establish a staggered system of new appointments for each interest group's members.

(4) The Task Force shall:

(a) Serve as the public advisory committee and advise the Director and Commission regarding rulemaking to implement the fish passage and waiver requirements;

(b) Prioritize projects from the statewide inventory of artificial dams and obstructions for purposes of enforcement;

(c) Recommend to the Director and Commission appropriate levels of funding and special conditions applicable to projects installing passage or alternatives to passage resulting in a net benefit to native migratory fish;

(d) Select one of its members to serve as chair and one as vice chair of the Task Force;

(e) Review and recommend to the Commission which projects should be exempt, and changes to the list of projects exempt from passage requirements under Section 8 of Section 2 of HB 3002 (2001);

(f) Report semiannually to the joint legislative committee created under ORS 171.551, or to the appropriate interim legislative committee with responsibility for salmon restoration or species recovery, advising the committee on matters related to fish passage;

(g) Review applications for waivers of the fish passage requirement, and advise the Commission as to whether alternative measures result in a net benefit to native migratory fish;

(h) Perform such other duties relating to fish passages requested by the Director or Commission;

(i) Meet at such times and places as may be determined by the chair or by a majority of members of the task force.

(5) The Department's Fish Passage Coordinator shall serve as staff for the task force.

(6) The chair of the Task Force shall conduct the meetings of the task force, serve as the main contact point between the Department and Commission and the Task Force and perform such other duties as the Task Force shall set. The vice chair of the task force shall serve as chair if the chair is unavailable to carry out the duties of chair.

(7) Members of the Task Force may not receive compensation for services as a member of the Task Force; however, in accordance with ORS 292.495, a member of the Task Force may receive reimbursement for actual and necessary travel or other expenses incurred in the performance of official duties.

Stat. Auth.: HB 3002
Stats. Implemented: HB 3002
Hist.: Adopted 1-24-02, f, & cert. ef. 2-4-02

10. 635-412-0015

Prioritization

(1) The Department shall establish for enforcement purposes a list of priority artificial obstructions at which fish passage would provide the greatest benefit to native migratory fish.

(2) The priority list shall be based on the needs of native migratory fish.

(a) The prioritization shall consider the following factors relative to each artificial obstruction for all native migratory fish currently or historically present at the artificial obstruction:

(A) The quantity of native migratory fish habitat which is inaccessible;

(B) The quality of native migratory fish habitat which is inaccessible;

(C) Unique or limited native migratory fish habitat which is inaccessible, or should remain inaccessible for fish management purposes;

(D) The biological status of the native migratory fish;

(E) The level of fish passage currently provided at the artificial obstruction;

(F) The presence of other artificial obstructions upstream and downstream and the timeframe native migratory fish will be able to utilize restored passage; and

(G) Existing agreements with the Department regarding fish passage.

(b) The prioritization may utilize existing Department information or professional judgment in the absence of information specific to a given site.

(c) The priority list shall contain one artificial obstruction per Oregon sub-basin, which shall be ranked across the state.

(d) The Department shall field verify the information used for prioritization prior to enforcement actions.

(e) The Department shall re-evaluate the priority list with the most recent information after enforcement occurs at five priority artificial obstructions or as directed by the Commission.

(3) The Commission shall review, approve, or amend the priority list after the initial priority list is developed, when the Department re-prioritizes, and no less frequently than once every five years.

(4) Once the Commission has approved the priority list, the Department may order a person owning or operating an artificial obstruction on the priority list who has been issued a water right, owns a lawfully installed culvert or owns another lawfully installed obstruction to install fish passage or to provide mitigation if:

(a) The Department can arrange for non-owner or non-operator funding of at least 60 percent of the cost for fish passage design, construction, and installation; and

(b) The artificial obstruction is ranked in the top ten for the state or highest within a Department Region on the priority list.

(5) Once the Department has arranged for non-owner or non-operator funding of at least 60 percent of the cost for fish passage design, construction, and installation at an artificial obstruction the owner or operator has two years to:

(a) Install a fish passage structure according to a fish passage plan approved by the Department; or

(b) Provide mitigation that the Commission determines is a net benefit to native migratory fish.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.585 and ORS 509.625 Hist.: Adopted 1-6-06, f. & certified ef. 1-9-06

11. 635-412-0020

Fish Passage Approval

(1) No person shall construct or maintain any artificial obstruction across any waters of this state that are inhabited, or were historically inhabited, by native migratory fish without providing passage for native migratory fish.

(2) Prior to construction, fundamental change in permit status or abandonment of an artificial obstruction in any waters of this state, a person owning or operating an artificial obstruction shall obtain a determination from the Department as to whether native migratory fish are or were historically present in the waters, unless the owner or operator assumes the presence of native migratory fish.

(3) If the Department determines, or the owner or operator assumes, that native migratory fish are or

were historically present in the waters, prior to construction, fundamental change in permit status, or abandonment of the artificial obstruction the person owning or operating the artificial obstruction shall either:

(a) Obtain from the Department an approval determination of a fish passage plan that meets the requirements of OAR 635-412-0035 for the specific artificial obstruction.

(b) Obtain from the Department a programmatic approval of a fish passage plan for multiple artificial obstructions of the same type. The Department may also grant programmatic approval to an agent for multiple owners or operators of artificial obstructions of the same type. Programmatic approvals are only valid so long as the owner or operator complies with the conditions of the programmatic approval. The Department shall only provide programmatic approval if:

(A) Fish passage structures placed under the programmatic approval meet criteria determined by the Department;

(B) The owner, operator, or agent demonstrates to the Department prior experience providing or approving acceptable fish passage structures;

(C) The owner, operator, or agent reports installation information annually to the Department, including but not limited to the location and installation date of all fish passage structures placed under the programmatic approval;

(D) The owner or operator allows, or the agent requires owners or operators to allow, the Department to inspect fish passage structures placed under the programmatic approval at reasonable times; and

(E) The owner, operator, or agent agrees to expeditiously remedy all fish passage structures placed under the programmatic approval which the Department finds do not meet the criteria or conditions of the programmatic approval.

(c) Pursuant to ORS 527.710(6), install and maintain road-stream crossing structures on non-federal forestlands in compliance with State Board of Forestry, through the Oregon Department of Forestry, rules and guidelines. These rules and guidelines require concurrence by the Oregon Department of Fish and Wildlife that they meet the purposes of the Department's fish passage program;

(d) Obtain a waiver from fish passage requirements for the artificial obstruction as provided in OAR 635-412- 0025; or

(e) Obtain an exemption from fish passage requirements for the artificial obstruction as provided in OAR 635-412-0025.

(4) Fish passage plans shall provide for and be implemented such that fish passage is installed at the artificial obstruction prior to completion of or by the end of the same in-water work period as the action which triggered fish passage requirements under subsection (2), unless:

(a) An owner or operator demonstrates to the Department an imminent or immediate threat to human safety which requires construction at a failed artificial obstruction prior to being able to complete the requirements of subsection (3), and the Department approves a fish passage plan in which the requirements of subsection (3) shall be met by the end of the next in-water work period or as soon as practicable. Providing passage at the time of construction is preferred;

(b) The Commission finds that additional time is necessary and appropriate given the size and scope of the project;

(c) Installation begins within this period and the Department finds that additional time to complete installation is necessary and appropriate given the size and scope of the project; or

(d) The Department finds that additional time is necessary and appropriate as part of the terms and conditions of a negotiated settlement for a federal proceeding, or in coordination with other federal requirements.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.585 and ORS 509.645 Hist.: Adopted 1-6-06, f. & certified ef.

1-9-06

12. 635-412-0025

Fish Passage Waivers and Exemptions

(1) Waivers from fish passage requirements shall be granted for an artificial obstruction if the Commission (or Department, as applicable) determines that mitigation rather than fish passage proposed by the person owning or operating the artificial obstruction provides a net benefit to native migratory fish.

(2) Net benefit to native migratory fish is determined by comparing the benefit to native migratory fish that would occur if the artificial obstruction had fish passage to the benefit to native migratory fish that would occur using the proposed mitigation. To qualify for a waiver of the requirement to install fish passage, mitigation shall result in a benefit to fish greater than that provided by the artificial obstruction with fish passage. The net benefit to fish determination shall be based upon conditions that exist at the time of comparison.

(3) Waivers shall be valid so long as the owner or operator continues to provide the agreed-upon mitigation measures and until the waived artificial obstruction undergoes further construction, a fundamental change in permit status, or abandonment.

(4) The Commission (or Department as applicable) may grant exemptions from fish passage requirements at an artificial obstruction if it is determined that:

(a) A lack of fish passage has been effectively mitigated;

(b) The owner or operator has received a legal waiver for the artificial obstruction from the Commission or the Department; or

(c) There is no appreciable benefit to providing fish passage.

(5) For exemptions granted under subsection (4)(a) and (4)(b), the exemption continues only so long as the original benefit of the mitigation is maintained.

(6) The Commission shall review, at least once every seven years, exempt artificial obstructions that do not have exemption expiration date to determine whether the exemption should continue. The Commission may revoke or amend an exemption if it finds that circumstances have changed such that the basis for the exemption no longer applies. An exemption granted as a result of an action which triggered fish passage requirements under OAR 635-412-0020(2) tolls the trigger event until the exemption is revoked.

(7) To obtain a waiver or an exemption from fish passage requirements, an owner or operator of an artificial obstruction shall obtain from and submit to the Department an application for the waiver or exemption.

(8) Based on application review, verification and site-specific knowledge, Department staff shall provide a written benefit analysis of whether the waiver request meets the requirements of subsection (1) or the exemption request meets the requirements of subsections (4) and (5). If there is some level of fish passage at the artificial obstruction, but it does not meet the requirements of OAR 635-412-0035, that passage shall be factored into the Department's net benefit analysis, allowing a reduction in required mitigation.

(9) To receive a waiver, or an exemption under subsection (4)(a), an owner or operator of an artificial obstruction shall enter an agreement with the Commission (or Department as applicable) that clearly describes timelines, duties, responsibilities, and options regarding the mitigation. The agreement shall state that the mitigation shall be completed prior to completion of or by the end of the same in-water work period as the action which triggered fish passage requirements under OAR 635-412-0020(2), unless the Commission finds that additional time is necessary and appropriate:

(a) Given the size and scope of the project or

(b) To coordinate with requirements of federal proceedings.

(10) Once the application, analysis, and a draft agreement are completed, a decision on whether the waiver or exemption shall be granted shall be made by:

(a) The Department:

(A) If it determines that the total stream distance, including tributaries, affected by the artificial obstruction for which the waiver or exemption is being sought is less than or equal to 1 mile to a natural barrier;

(B) If the request is for an exemption under subsection (4)(a) or (4)(b); or

(C) For re-authorization of an existing hydroelectric project subject to ORS 543A.030 to ORS 543A.055 and not subject to federal hydroelectric relicensing; and

(b) The Commission:

(A) In all other instances; or

(B) If the Department refers a decision to the Commission; or

(C) If the owner or operator files a protest of the Department's determination to the Commission.

(11) The decision to grant a waiver or exemption shall include the determination described in subsection (1) or (4) as well as approval of the agreement required in subsection (9).

(12) In addition to the Fish Passage Task Force as prescribed in OAR 635-412-0010(4)(e) and (g), the Department shall notify local watershed council(s), local soil and water conservation district(s), identified stakeholders, and others who have expressed an interest in fish passage issues or the specific waiver or exemption request and provide an opportunity to comment on the request at least three weeks prior to a decision on whether the waiver or exemption should be granted.

(13) The Commission (or Department, as applicable) may require further public comment prior to a decision on whether a waiver or exemption should be granted.

(14) The Department shall maintain a database of the locations of waived and exempted artificial obstructions and mitigation.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.585 and ORS 509.645 Hist.: Adopted 1-6-06, f. & certified ef. 1-9-06

13. 635-412-0030

Fish Passage Protests

(1) A person owning or operating an artificial obstruction may request alternative dispute resolution at any point in the process of determining fish passage requirements.

(2) The owner or operator of the artificial obstruction who objects to a determination made by the Department under these rules may file a protest with the Commission. Protests must be submitted in writing within 30 days of receipt of a written determination from the Department and must include the grounds for protesting the Department's determination.

(3) The Commission may approve, deny, or modify the Department's determination after sufficient opportunity for public review and comment.

(4) If a protest is not filed within 30 days of receipt of a written determination from the Department, the Department's determination shall become a final order.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.585 and 509.645 Hist.: Adopted 11-12-04, filed and ef. 11-17-04

14. 635-412-0035

Fish Passage Criteria

(1) General requirements for fish passage are:

(a) Unless the owner or operator of an artificial obstruction chooses to provide year-round fish

passage for all native migratory fish and life history stages, the Department shall determine:

(A) Native migratory fish currently or historically present at the site which require fish passage;

(B) Life history stages which require fish passage; and

(C) Dates of the year and/or conditions when passage shall be provided for the life history stages and native migratory fish;

(b) The person submitting the fish passage plan to the Department for approval shall submit all information necessary to efficiently evaluate whether the design will meet fish passage criteria;

(c) If site-specific circumstances indicate that the fish passage criteria are not adequate to provide fish passage, the Department may require in writing that additional fish passage criteria be met;

(d) If native migratory fish- or site-specific circumstances warrant it, the Department may provide an exception to any specific fish passage criterion if the Department determines in writing that fish passage shall still be provided;

(e) All fish passage structures shall be designed to take into consideration their upstream and downstream connection and prevent undesirable impacts to fish passage, including but not limited to scour and headcuts;

(f) If joint state and federal approval is required, the Department shall take into account federal requirements during approval;

(g) Primarily at sites with little existing site information or questionable design solutions, the Department may require monitoring and reporting to determine if a fish passage structure meets applicable criteria and/or is providing fish passage; and

(h) The person owning or operating an artificial obstruction shall maintain the fish passage structure in such repair and operation as to provide fish passage of native migratory fish at all times required by the Department.

(2) Requirements for fish passage at dams and other artificial obstructions which create a discontinuity between upstream and downstream water surface or streambed elevations are:

(a) Fishways shall provide fish passage at all flows within the design streamflow range;

(b) The fishway entrance shall be located and adequate attraction flow shall be provided at one or more points where fish can easily locate and enter the fishway;

(c) Fishwaywater velocities shall:

(A) Range between 1 and 2 feet per second in transport channels;

(B) Average no greater than 5 feet per second in baffled-chute fishways, including but not limited to Alaska steeppasses and denils; and

(C) Not exceed 8 feet per second in discrete fishway transitions between the fishway entrance, pools, and exit through which fish must swim to move upstream, including but not limited to slots, orifices, or weir crests;

(d) At any point entering, within, or exiting the fishway where fish are required to jump to move upstream, the maximum difference between the upstream and downstream water surface elevations shall be 6 inches, except it shall be 12 inches if only salmon or steelhead adults require fish passage;

(e) In fishway locations through which fish must swim, water depths shall be a minimum of 6 inches where only juveniles require passage and 12 inches where adults require passage, except:

(A) Baffled-chute fishways, including but not limited to Alaska steeppasses and denils, shall have a minimum flow depth of 2 feet throughout the length of the fishway; and

(B) Water depths shall be a minimum of 2 feet within jump pools which shall be located downstream of any point entering, within, or exiting the fishway where fish are required to jump to move upstream;

(f) All fishway locations through which fish must swim shall be at least 12 inches wide;

(g) Fishway pools shall:

(A) Be sized according to the native migratory fish and life history stages requiring passage and to avoid over-crowding,

(B) Have V ≥ *w*QH/4 at all flows within the design streamflow range, where:
(i) "V" is the water volume in cubic feet;
(ii) "*w*" is 62.4, the unit weight of water, in pounds per cubic foot;
(iii) "Q" is the fish ladder flow in cubic feet per second;
(iv) "H" is the energy head of pool-to-pool flow in feet; and
(v) 4 has a unit of foot-pounds per second per cubic foot;
(C) Where the fishway bends 90 degrees or more, have turning pools with a flowpath centerline double the length of non-turning pools; and
(D) Be placed at least every 25 feet of horizontal distance in baffled-chute fishways, including but not limited to Alaska steeppasses and denils;
(h) The fishway exit should be located to minimize the risk of fish unintentionally falling downstream of the artificial obstruction;
(i) Fishway trash racks shall:
(A) Allow for easy maintenance and debris removal;
(B) Have a minimum clear space between vertical members of 9 inches, except:
(i) 10 inches shall be provided if adult chinook are present; and
(ii) At least 4 inches shall be provided if only juveniles are present; and
(C) Have a minimum clear space between horizontal members of 12 inches.
(j) The fishway shall:
(A) Have water temperatures which are within 1 degree Fahrenheit of the water entering the fishway;
(B) Be designed to assure that fish do not leap out of the fishway;
(C) Have all edges and fasteners which fish may contact ground smooth or chamfered;
(D) Not have protrusions extend into the flow path of the fishway;
(E) Have as much ambient lighting as possible;
(F) Have fishway components which are not detailed in OAR 635-412-0035(2), including but not limited to auxiliary water systems, designed considering the most recent National Marine Fisheries Service or U.S. Fish and Wildlife Service fish passage criteria and guidelines; and
(G) Meet the species-specific requirements in OAR 635-412-0035(7) if any of those native migratory fish require fish passage.
(k) Requirements for specific types of fishways include:
(A) Baffled-chute fishways, including but not limited to Alaska steeppasses and denils, shall not be used in areas where downstream passage will occur through the baffled-chute fishway,
(B) All fishways of a specific type with accepted configurations shall comply with those configurations,
and
(C) Fish passage plans for stream channel-spanning weirs, roughened channels (including but not
limited to nature-like, rock, or engineered-stream fishways), and hybrid fishways (including but not limited to pool- and-chute ladders) which may combine criteria elements of natural streams and/or established fishway types (including but not limited to pool-and-weir, vertical slot, and baffled-chute fishways) shall clearly demonstrate how water depths, water velocities, water drops, jump pools, structure sizing, and fish injury precautions shall provide fish passage;
(l) For downstream fish passage: [Note: fish screening and bypass requirements for diverted water are separate from these requirements.]
(A) Fish passage structures shall have an open water surface, except a submerged or enclosed conduit or orifice may be utilized if:
(i) Acceptable guidance or collection mechanisms are used and kept free from debris;
(ii) Water depth is greater than 4 inches during all flows;
(iii) Water velocity is greater than 2 feet per second during all flows;
(iv) Water is not pumped;

(v)Conduits have smooth surfaces and avoid rapid changes in direction to preclude fish impact and injury; and

(vi) conduits are at least 10 inches wide.

(B) Plunging flow moving past an artificial obstruction via spillways, outlet pipes, or some other means which may contain fish shall:

(i) At all flows, fall into a receiving pool of sufficient depth, depending on impact velocity and quantity of flow, to ensure that fish and flow shall not impact the stream bottom or other solid features; and

(ii) Have a maximum impact velocity into a receiving pool, including vertical and horizontal velocity components, less than 25 feet per second; and

(C) water depth over spillways shall be greater than 4 inches during all flows.

(3) Requirements for fish passage at road-stream crossing structures such as bridges and culverts are:

(a) Stream Simulation Option:

(A) Open-bottomed and closed-bottom road-stream crossing structures shall have beds under or within the structure that:

(i) Are equal to or greater than the active channel width, as measured at sufficient locations outside the influence of any artificial or unique channel constrictions or tributaries both upstream and downstream of the site;

(ii) Are equal to the slope of, and at elevations continuous with, the surrounding long-channel streambed profile, unless the Department approves maintaining a pre-existing road-impounded wetland;

(iii) Have, for open-bottomed road-stream crossing structures, a minimum of 3 feet vertical clearance from the active channel width elevation to the inside top of the structure;

(iv) Maintain average water depth and velocities that simulate those in the surrounding stream channel; and

(v) Are composed of material that:

(I) Assures the bed under or within the road-stream crossing structure is maintained through time;

(II) Is either natural (similar size and composition as the surrounding stream) or supplemented to address site-specific needs including, but not limited to, bed retention and hydraulic shadow;

(III) Contains partially-buried, over-sized rock if the road-stream crossing structure is greater than 40 feet in length;

(IV) Is mechanically placed during structure installation rather than allowed to naturally accumulate, unless the surrounding streambed is primarily bedrock; and

(V) Excluding partially-buried over-sized rock, is, for closed-bottom road-stream crossing structures, at a minimum depth of 20 percent of the structure height and a maximum depth of 50 percent of the structure height; and

(B) Trash racks shall not extend below the active channel width elevation and shall have a minimum of 9 inches clear spacing between vertical members; or

(b) Alternative Option: the Department may approve road-stream crossing structures for which clear justification is provided, based on fish performance and/or fish behavior data and hydraulic conditions, that the alternative design shall provide fish passage.

(4) Requirements for fish passage at artificial obstructions in estuaries, and above which a stream is present, are:

(a) Fish passage shall be provided at all current and historic channels;

(b) Fish passage structures shall meet the criteria of OAR 635-412-0035(2) or (3), except fish passage structures shall be sized according to the cumulative flows or active channel widths, respectively, of all streams entering the estuary above the artificial obstruction; and

(c) Tide gates and associated fish passage structures shall be a minimum of 4 feet wide and shall meet the requirements of OAR 635-412-0035(2) within the design streamflow range and for an average of at least 51% of tidal cycles, excluding periods when the channel is not passable under natural conditions.

(5) Requirements for fish passage at artificial obstructions in estuaries, floodplains, and wetlands, and above which no stream is present, are:

(a) Downstream Fish Passage.

(A) Downstream fish passage shall be provided after inflow which may contain native migratory fish;

(B) Downstream fish passage shall be provided until water has drained from the estuary, floodplain, or wetland, or through the period determined by the Department which shall be based on one, or a combination of, the following:

(i) A specific date;

(ii) Water temperature, as measured at a location or locations determined by the Department;

(iii) Ground surface elevation;

(iv) Water surface elevation; and/or

(v) Some other reasonable measure;

(C) Egress delays may be approved by the Department based on expected inflow frequency if there is suitable habitat and as long as passage is provided by the time the conditions in OAR 635-412-0035(5)(a)(B) occur;

(D) A minimum egress flow of 0.25 cubic feet per second (cfs) at one point of egress shall be provided;

(E) Egress flow of 0.5 cfs per 10 surface acres, for at least the first 100 surface acres of impounded water, shall be provided;

(F) All plunging egress flows shall meet the requirements of OAR 635-412-0035(2)(l)(B);

(G) If egress flow is provided by a pump, it shall be appropriately screened;

(H) The minimum water depth and width through or across the point of egress shall be 4 inches;

(I) The ground surface above the artificial obstruction shall be sloped toward the point(s) of egress to eliminate isolated pools; and

(J) An uninterrupted, open connection with a minimum water depth of 4 inches shall be present from the point of egress to the downstream waters of this state, unless another connection is provided as per OAR 635- 412-0035(2)(l)(A).

(b) Upstream Fish Passage: a fishway or road-stream crossing structure with or without a tide gate shall be provided during the period determined by the Department if there is current or historic native migratory fish spawning or rearing habitat within the estuary, floodplain, or wetland area impounded by the artificial obstruction.

(6) Requirements for fish passage at traps are:

(a) A collection permit issued by the Department is required to operate all traps;

(b) Traps shall be constructed to prevent physical or physiological injury to native migratory fish;

(c) Traps shall meet all requirements of OAR 635-412-0035(2)(g);

(d) Traps located within a fishway (i.e., "in-ladder" traps) shall not inhibit native migratory fish from entering the fishway or trap and shall be removed if the Department determines that fish are not entering the trap;

(e) Native migratory fish shall be processed through traps with minimal possible delay and as frequently as necessary to avoid over-crowding;

(f) All native migratory fish, excluding those which have approved take authorization from the Department and which do not require fish passage as per OAR 635-412-0035(1)(a), shall be returned to the stream by one of the following methods:

(A) Movement from the trap to immediately-adjacent water which has fish passage, or

(B) Transport within a watered container, including but not limited to lifts, hoppers, locks,

and trucks, from the trap to a location approved by the Commission.
(7) Additional requirements for specific native migratory fish are:
(a) *Acipenser* species (sturgeon).
(A) The fish passage structure shall not require fish to jump when entering, within, or exiting the structure;
(B) The fish passage structure, including trash racks, shall be sized to accommodate the largest individual expected to require fish passage; and
(C) Non-volitional transport within a watered container shall be allowed with Department approval.
(b) *Catostomus* and *Chasmistes* species (suckers).
(A) The fish passage structure shall not require fish to jump when entering, within, or exiting the structure;
(B) Fishways shall have a maximum water velocity of 4 feet per second;
(C) Fishways shall have a minimum water depth of 12 inches;
(D) Fishways shall maximize downstream flow between pools to avoid back eddies;
(E) Fishways shall have curved walls within turning pools; and
(F) Fishways shall have a slope less than 4 percent.
(c) *Lampetra* species (lamprey).
(A) Fishways shall not have overhanging surfaces;
(B) Fishways shall have rounded or chamfered edge surfaces over which *Lampetra* species may pass;
(C) Fishways shall, in locations with water velocities greater than 2 feet per second, have a passage route that:
(i) Has a smooth, impermeable, uninterrupted surface or a simulated streambed;
(ii) Has water velocities over the structure's surface less than 8 feet per second; and
(iii) Is wetted.
(d) *Oncorhynchus* species (trout and salmon): fish passage structures for *Oncorhynchus keta* (chum) shall not require fish to jump when entering, within, or exiting the structure.
(e) *Ptychocheilus* species (pikeminnow): fish passage structures shall meet the requirements of OAR 635- 412-0035(7)(a).
(f) If more than one native migratory fish species requires passage at a site and the requirements for the different species are mutually exclusive, the Department shall determine passage criteria.
(8) Requirements for artificial obstruction removal are:
(a) Artificial obstruction removals shall follow the requirements of OAR 635-412-0035(10);
(b) If not completely removed, no parts of the remaining artificial obstruction shall:
(A) Constrict the stream channel; or
(B) Cause low flow depths less than the surrounding stream channel;
(c) After an artificial obstruction is removed the stream channel shall be restored; and
(d) The stream channel restoration shall address impacts to stream habitat caused by the artificial obstruction while in place and by its removal, including but not limited to upstream and downstream channel degradation, and provisions shall be made to address unexpected fish passage issues resulting from removal.
(9) Requirements for exclusion barriers are:
(a) Exclusion barriers shall only be placed in the following situations, when fish passage is not required or is provided by other means:
(A) To guide fish to an approved fish passage structure or trap;
(B) To prevent fish from leaving waters of this state and entering human-made water supply conduits;
(C) To prevent fish from entering waters of this state associated with operations of another artificial obstruction that could lead to fish injury; or

(D) To achieve other fish management objectives approved in writing by the Department; and

(b) Exclusion barriers shall comply with National Marine Fisheries Service or U.S. Fish and Wildlife Service criteria.

(10) Requirements for fish passage during construction of fish passage structures and periods when temporary artificial obstructions are in place are:

(a) All fish passage structures shall be constructed and temporary artificial obstructions shall be in place only during the site-specific in-water work period defined or approved by the Department;

(b) At times indicated by the Department as per OAR 635-412-0035(1)(a), downstream fish passage shall be provided and:

(A) The outfall of a stream flow bypass system shall be placed to provide safe reentry of fish into the stream channel; and

(B) If downstream fish passage during construction is not required and stream flow is pumped around the site, the site shall meet Department screening and/or bypass requirements;

(c) At times indicated by the Department as per OAR 635-412-0035(1)(a), upstream fish passage shall be provided and shall be based on the wetted-width or flows of the stream during the period of construction or temporary obstruction;

(d) In-stream construction sites shall be isolated from stream flow and fish;

(e) Prior to in-stream construction activities, all fish shall be safely collected, removed from the construction site or de-watered reach, and placed in the flowing stream by an authorized person with a collection permit issued by the Department; and

(f) After construction, the construction site shall be re-watered in a manner to prevent loss of downstream surface water as the construction site's streambed absorbs water.

(11) Requirements for experimental fish passage structures are:

(a) Experimental fish passage structures shall only be allowed in waters of the state after:

(A) Laboratory testing with native migratory fish or similar species indicates that the structure is feasible to provide fish passage;

(B) Field testing with a prototype structure, at a location where existing fish passage will not be compromised and where fish passage does not need to be addressed under OAR 635-412-0020(2) and (3), indicates that the structure is likely to provide fish passage; and

(C) In addition to information needed to evaluate the structure's design for the specific location, the following are submitted to the Department and approved:

(i) A written summary of the laboratory and field testing and how the results indicate that fish passage shall be provided;

(ii) A monitoring and reporting plan to determine if the installed experimental fish passage structure meets applicable design objectives and is providing fish passage; and

(iii) A modification plan for the experimental fish passage structure if monitoring indicates that fish passage is not being provided, including standard thresholds that will initiate these modifications;

(b) If at any time an experimental fish passage structure is deemed by the Department in writing to not provide fish passage, the owner or operator, in consultation with the Department, shall make such modifications to the structure or operation as are necessary to provide fish passage, and, after a reasonable period, if modifications are deemed by the Department in writing to not provide fish passage, a fish passage structure that meets the standard criteria of OAR 635-412-0035 shall be installed as soon as practicable but no later than the end of the next complete in-water work period after notification by the Department;

(c) The owner or operator of an experimental fish passage structure shall allow the Department to inspect experimental fish passage structures at reasonable times;

(d) Five years after the experimental fish passage structure is installed and fish are present to attempt passage a final monitoring report shall be submitted to the Department and the Department shall determine if the experimental fish passage structure provides fish passage;

(e) If the Department determines that the experimental fish passage structure does not provide

fish passage, a fish passage structure that meets the standard criteria of OAR 635-412-0035 shall be installed as soon as practicable but no later than the end of the next complete in-water work period after notification by the Department; and

(f) After three experimental fish passage structures of the same design concept are placed in waters of the state and deemed to provide fish passage by the Department, the experimental fish passage structure shall no longer be considered experimental.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.585 and
509.610 Hist.: Adopted 1-6-06, f. & cert.
ef. 1-9-06

15. 635-412-0040
Mitigation Criteria

(1) Mitigation shall not be allowed for artificial obstructions located in, or which would prevent access to, "Habitat Category 1" habitat for native migratory fish as described in OAR 635-415-0025(1).
(2) Mitigation options include:

(a) Providing fish passage at another pre-existing artificial obstruction which is not required to address fish passage under OAR 635-412-0015 or 635-412-0020;

(b) Restoration or enhancement of native migratory fish habitat;

(c) Fish management measures to directly increase naturally-producing, wild, native migratory fish populations; and

(d) Other actions specifically approved by the Commission.

(3) Mitigation shall not include any activity that is a requirement or condition of any other agreement, law, permit, or authorization except if it is also for fish passage mitigation of the same action at the artificial obstruction for a different level of government.
(4) Unless a fish passage waiver for a site has already been obtained and mitigation has been provided, mitigation activities shall not be completed prior to a decision regarding a fish passage waiver.
(5) The Department shall approve final mitigation designs in writing prior to implementation (Note: mitigation actions or concepts, absent specific designs, can be approved at the time a waiver decision is made).
(6) Mitigation actions that provide fish passage shall meet the fish passage criteria contained in OAR 635-412- 0035.
(7) The Commission may require the posting of a bond or other financial instrument acceptable to the Commission to cover the cost of mitigation actions or providing fish passage at the artificial obstruction if the mitigation action does not achieve its goals.
(8) A person owning or operating an artificial obstruction is responsible for maintaining, monitoring, evaluating the effectiveness of, and reporting on mitigation.
(9) Mitigation:

(a) Shall be conducted in-proximity to the artificial obstruction, with respect to geographic scope;

(b) Shall have habitat type and quality which is more beneficial than that affected by the artificial obstruction, if mitigation is passage into, restoration of, or enhancement of habitat;

(c) Shall at least benefit the same native migratory fish species affected at the artificial obstruction;

(d) Shall have a clear benefit for those native migratory fish species affected at the artificial obstruction if their status is listed as "threatened" or "endangered" under the state or federal Endangered Species Act;

(e) Shall have standards for monitoring, evaluating, and adaptive management which are approved by the Department, which assure that the goal of the mitigation is achieved and maintained, and which are detailed in the waiver agreement required in OAR 635-412-0025(9);

(f) Shall be considered if the owner or operator of the artificial obstruction believes the feasibility of fish passage at the artificial obstruction is less than that for mitigation;

(g) May require quantification of baseline conditions before a decision regarding a fish passage waiver is made in situations with no existing information, which require recent information, or which have no clear benefit;

(h) Shall attempt to restore or enhance historic conditions;

(i) To the extent possible, shall be consistent with existing native migratory fish or watershed management plans;

(j) May qualify for financial incentives or grants issued by the Department and the owner's or operator's cost for mitigation or passage at the artificial obstruction shall not be a factor in the Department's net benefit determination;

(k) May require data collection and evaluation before a decision regarding a fish passage waiver is made in situations with no existing information, which require recent information, or which have no clear benefit; and

(l) Shall be consistent with the purpose and goals of the Oregon Plan.

Stat. Auth.: ORS 496.138
Stats. Implemented: ORS 509.580, 509.585, and 509.610 Hist.: Adopted 1-6-06, f. & certified ef. 1-9-06

ATTACHMENT D: ODFW FISH PASSAGE FORMS

ATTACHMENT D.1: EAST BAY DRIVE BRIDGE FORM

OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage Plan for a Road-Stream Crossing

- *If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.*
- *If your project includes multiple crossings, please complete this form for each crossing.*

APPLICANT INFORMATION

APPLICANT: Natalie Eades **TITLE:** Owner's Representative
ORGANIZATION: Jordan Cove Energy Project L.P.
ADDRESS: 111 SW 5th Ave., Suite 1100
CITY: Portland, **STATE:** OR **ZIP:** 97204
PHONE: 713-504-3933
FAX:
E-MAIL ADDRESS: neades@pembina.com
SIGNATURE: Natalie Eades **DATE:** 2/14/19

AUTHORIZED AGENT *(if any)*: Jay Lorenz **TITLE:** Senior Scientist
ORGANIZATION: TRC
ADDRESS: 111 SW 5th Ave., Suite 1100
CITY: Portland **STATE:** OR **ZIP:** 97204
PHONE: 425-657-9052
FAX:
E-MAIL ADDRESS: jlorenz@trcsolutions.com

SIGNATURE: _____ **DATE:** _____

OWNER *(if different than Applicant)*: **TITLE:**
ORGANIZATION:
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:

SIGNATURE: Jay Lorenz **DATE:** 14 Feb 2019

LOCATION

- **COUNTY** ..... Coos
- **ROAD** ..... East Bay Drive
- **RIVER/STREAM** ..... Kentuck Inlet
- **TRIBUTARY OF** ..... Coos Bay
- **BASIN** ..... 171003040306 (Coos Bay)
- **COORDINATES** [a] ..... Longitude: -123.18756 Latitude: 43.42156
- **LEGAL DESCRIPTION** ..... ¼ / ¼: NENE
  Section: 12 Tax Map #: 25S13W12A
  Township: 25S Tax Lot #: 100
  Range: 13W

[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

STREAM CROSSING INFORMATION

Please indicate measurement units where applicable and see footnotes for supporting descriptions of the information requested.

NEW CROSSING ☒
REPLACEMENT OF EXISTING CROSSING ☐
MODIFICATION OF EXISTING CROSSING ☐

EXISTING CROSSING	• **TYPE/SHAPE** [b] ..... N/A • **MATERIAL** [c] ..... N/A • **LENGTH** ..... N/A • **INSIDE DIAMETER** (*if round*) ..... N/A **OR** **INSIDE RISE** (Height) **AND** ..... N/A **INSIDE SPAN** (Width) ..... N/A • **CULVERT SLOPE** ..... N/A • **DOES IT CONTROL AN UPSTREAM POND, WETLAND, BACKWATER AREA, OR WATER RIGHT?** [d] ..... Yes ☐ No ☐
STREAM	• **AVERAGE UPSTREAM ACW** [e,f] ..... N/A • **AVERAGE DOWNSTREAM ACW** [e,f] ..... N/A • **UPSTREAM SLOPE** [g] ..... N/A • **DOWNSTREAM SLOPE** [g] ..... N/A • **DESCRIBE STREAMBED MATERIAL** ... Silt/clay • **SIZE OF D_{100} ROCK** [h] ..... <1 in. (silt/sand)
PROPOSED CROSSING	• **TYPE/SHAPE** [b] ..... Single span slab bridge • **MATERIAL** [c] ..... Concrete slabs, sheet pile wall end bents • **LENGTH** ..... 67 ft. • **INSIDE DIAMETER** (*if round*) ..... N/A **OR** **INSIDE RISE** (Height) **AND** ..... N/A **INSIDE SPAN** (Width) ..... 36 ft. • **CULVERT SLOPE** ..... N/A • **BED HEIGHT – INLET** [i,j] ..... -2.0 ft. (NAVD88) • **BED HEIGHT – OUTLET** [i,k] ..... -2.0 ft. (NAVD88) • **BED SLOPE** [i] ..... 0.0 % • **BED MATERIAL** [i] (*describe and/or fill in %s*) . N/A **% FINES** (*dirt, silt, sand*) ..... **% SMALL ROCK** (*½-6" diameter*) ..... **% LARGE ROCK** (*6"-D_{100}*) [h] ..... **% OVER-SIZED ROCK** (D_{150}-D_{200}) [h] ... • **BED PLACEMENT METHOD** [i] ..... N/A; excavate to native material • **BED RETENTION MEASURES** [i] ..... N/A • **GRADE CONTROL MEASURES** [l] ..... N/A • **ADDITIONAL STRUCTURES** [m] ..... Sheetpile abutments driven deep to prevent scour
CONSTRUCTION	• **DATE WORK WILL BEGIN** ..... January 2020 • **DATE WORK WILL BE COMPLETED** .. January 2024 • **DETAILS** [n] .....

MAINTENANCE			
	• **WILL THE CROSSING BE INSPECTED FOR DEBRIS AND BED RETENTION (WITHIN, BELOW, AND ABOVE THE CROSSING) AT LEAST ANNUALLY AND AFTER STORM EVENTS?**	Yes ☒	No ☐
	• **IF NEEDED, WILL REMEDIAL MEASURES BE TAKEN AS SOON AS POSSIBLE?**	Yes ☒	No ☐

[b] *e.g., bridge, open-bottomed arch, pipe arch/squashed, round, rectangular*

[c] *e.g., reinforced concrete, concrete, wood, plastic, corrugated metal, metal*

[d] *if "Yes", explain how these will be addressed in a separate attachment*

[e] *"ACW" is the active channel width, which is the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate; ordinary high water lines are not the same as the wetted width and are typically determined by changes on the bank in vegetation, changes in sediment size and/or color, water lines on the bank, trees, or leaves, or the point where debris (e.g., needles, leaves, twigs, cones) accumulation begins*

[f] *3 measurements 20 feet apart should be averaged; begin measurements approximately 10 ACWs from the inlet (upstream) or outlet (downstream) of the crossing if this distance is outside of the influence of existing artificial obstructions and prior to adjoining tributaries as you move away from the crossing (if not, take measures at locations which fulfill these requirements); indicate measurement locations on the* **Profile Design Drawing**

[g] *take measurements away from the crossing and at the point where ACW measurement begins*

[h] *D_{100} is the average diameter of the 10 largest, naturally-occurring rocks in the stream reach; $D_{150} = D_{100} \times 1.5$; $D_{200} = D_{100} \times 2$*

[i] *"bed" refers to the stream bed within or under the crossing structure*

[j] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's inlet*

[k] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's outlet*

[l] *these are measures outside of the crossing structure intended to prevent up- or downstream channel degradation, especially important to consider in locations where an existing smaller culvert is being replaced and there is the potential for upstream channel degradation (i.e., a "headcut") and associated off-site property or passage problems*

[m] *e.g., bed retention measures, weirs, baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures*

[n] *unless already described in an accompanying Department of State Lands Removal-Fill Application, include a description of a) temporary downstream passage, upstream passage, screening, and bypass measures, b) worksite isolation measures, c) fish salvage (note: an ODFW Fish Take Permit may be necessary), d) sediment and erosion control measures, and e) site restoration measures. For more details on Oregon Fill Removal Law see the Oregon Division of State Lands Removal-Fill Guide at* http://oregonstatelands.us/DSL/PERMITS/rfg.shtml .

ADDITIONAL INFORMATION

*Provide this information **only if** the bed within the proposed crossing is not as wide as the active channel width or will not be embedded.*

	High Design Flow [o]	Low Design Flow [p]
Flow [q] (cfs)		
Water Depth in Crossing (in.)		
Water Velocity in Crossing (fps)		
Water Drop [r] at Inlet (in.)		
Water Drop [r] at Outlet (in.)		
Pool Depth Below Outlet (in.)		
Water Drop [r] at Weirs/Baffles (in.)		
Pool Depth Below Weirs/Baffles (in.)		
Depth of Nappe [s] at Weirs/Baffles (in.)		

[o] *High Design Flow is the mean daily average stream discharge that is exceeded 5 percent of the time during the period when ODFW determines that native migratory fish require fish passage*

[p] *Low Design Flow is the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when ODFW determines that native migratory fish require fish passage*

[q] *attach a description of the methodology, calculations, and assumptions used to determine the high and low design flows*

[r] *drop should be measured from the upstream water surface elevation to the downstream water surface elevation*

[s] *the nappe is the water flowing over weirs/baffles*

DESIGN DRAWINGS

Please attach the following design drawings with the specified information on them.

☒ -- **PLAN**, including:
- active channel (i.e., ordinary high water or bankfull lines)
- existing crossing and additional structures
- proposed crossing and additional structures
- dimensions

☒ -- **PROFILE**, including:
- existing grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet [i.e., downstream end of crossing] to 10 ACWs upstream of the inlet [i.e., upstream end of crossing], at 5-foot intervals), including road
- existing crossing and additional structures
- proposed grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet to 10 ACWs upstream of the inlet, at 5-foot intervals), including road
- proposed crossing, bed, and additional structures
- dimensions
- location of **STREAM CHANNEL CROSS-SECTIONS** (see below), *ACW* measurements, and *Slope* measurements
- water surface elevations at high and low design flows for the proposed crossing, **if** the proposed crossing will not be as wide as the active channel width or will not be embedded

☐ -- **CROSS-SECTION OF PROPOSED CROSSING**, including bed details

☐ -- **STREAM CHANNEL CROSS-SECTIONS** *(2 cross-sections total, with one located downstream where the ACW measurements begin and one located upstream where the ACW measurements begin; measurements should be taken at 1-foot intervals perpendicular to the flow of the stream and should encompass the entire active channel plus 0.5 ACW on each side of the stream [for a total cross-section measurement of 2 x ACW]; measurements may be taken with survey equipment or by measuring the distance from a level line to the bottom of the streambed or ground)*

☐ -- **DETAILS OF ADDITIONAL STRUCTURES** *(e.g., grade control measures, bed retention measures, weirs/baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures)*

Please submit this application along with project design plans to the appropriate ODFW District Fish Biologist for the crossing's location. The complete application can also be sent electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

ODFW FISH PASSAGE APPROVAL #PA-00-0000
(insert name of project)

• *ODFW will use the following criteria to determine the level of review required.*

For ODFW Use Only

	YES	NO	N/A
1. Is the bed within the crossing as wide as the active channel:	☐	☐	☐
2. Is the bed within the culvert at the same slope, and at grades continuous with, the surrounding stream:	☐	☐	☐
3a. If the crossing is open-bottomed, is there 3 feet of vertical clearance between the active channel width elevation and the inside top of the crossing:	☐	☐	☐
OR			
3b. If the crossing is closed-bottomed, will bed depth within the culvert be 20-50% of the crossing height:	☐	☐	☐
4. Is the bed material that will be used sufficient to assure water depth will be similar to that in the surrounding stream (i.e., will not go sub-surface prematurely):	☐	☐	☐
5. Are the bed material or retention measures that will be used sufficient to assure that the bed will be maintained through time:	☐	☐	☐
6. If the crossing is longer than 40 feet, will partially-buried, over-sized rock be placed within the crossing's bed:	☐	☐	☐
7. Will the bed within the crossing be placed during construction:	☐	☐	☐
8. If trash racks are present, are they above the active channel width elevation and do vertical bars have at least 9 inches of clear space between them:	☐	☐	☐
9. If there is an upstream pond, wetland, or backwater area, has its desired state after construction been determined, and have these considerations been addressed in the design:	☐	☐	☐
10. Are upstream grade control measures satisfactory:	☐	☐	☐
11. Are the construction timing and measures adequate based on the location:	☐	☐	☐
12. Are there plans to maintain the crossing:	☐	☐	☐

- If all answers are "Yes" or "Not Applicable", this plan is eligible for approval by an ODFW biologist.
- If any answer is "No" or there are other concerns, consult with the Fish Passage Coordinator.

APPLICATION IDENTIFIER: (insert name of project & applicant) **ODFW # PA-00-0000**
DATE RECEIVED: (insert date)

APPROVED ☐ **SIGNATURE:** _____ **DATE:** _____

DENIED ☐ **TITLE:**

CONDITIONS:

ATTACHMENT D.2: GOLF COURSE LANE CULVERT FORM

OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage Plan for a Road-Stream Crossing

- *If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.*
- *If your project includes multiple crossings, please complete this form for each crossing.*

APPLICANT INFORMATION

APPLICANT: Natalie Eades **TITLE:** Owner's Representative
ORGANIZATION: Jordan Cove Energy Project L.P.
ADDRESS: 111 SW 5th Ave., Suite 1100
CITY: Portland, **STATE:** OR **ZIP:** 97204
PHONE: 713-504-3933
FAX:
E-MAIL ADDRESS: neades@pembina.com

SIGNATURE: Natalie Eades **DATE:** 2/14/19

AUTHORIZED AGENT *(if any)*: Jay Lorenz **TITLE:** Senior Scientist
ORGANIZATION: TRC
ADDRESS: 111 SW 5th Ave., Suite 1100
CITY: Portland **STATE:** OR **ZIP:** 97204
PHONE: 425-657-9052
FAX:
E-MAIL ADDRESS: jlorenz@trcsolutions.com

SIGNATURE: Jay Lorenz **DATE:** 14 Feb 2019

OWNER *(if different than Applicant)*: **TITLE:**
ORGANIZATION:
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:

SIGNATURE: _____ **DATE:** _____

LOCATION

- **COUNTY** ..... Coos
- **ROAD** ..... Golf Course Lane
- **RIVER/STREAM** ..... Un-named Stream
- **TRIBUTARY OF** ..... Coos Bay
- **BASIN** ..... 171003040306 (Coos Bay)
- **COORDINATES** [a] ..... Longitude: -123.118052 Latitude: 43.42232
- **LEGAL DESCRIPTION** ..... ¼ / ¼: NENE
  Section: 6 Tax Map #: 25S13W07
  Township: 25S Tax Lot #: 0070000
  Range: 13W

[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

STREAM CROSSING INFORMATION

Please indicate measurement units where applicable and see footnotes for supporting descriptions of the information requested.

NEW CROSSING ☐
REPLACEMENT OF EXISTING CROSSING ☒
MODIFICATION OF EXISTING CROSSING ☐

EXISTING CROSSING	• **TYPE/SHAPE** [b] ..... Overflow pipe • **MATERIAL** [c] ..... Concrete • **LENGTH** ..... Approx. 20 ft. • **INSIDE DIAMETER** (*if round*) ..... 1ft. **OR** **INSIDE RISE** (Height) **AND** ..... **INSIDE SPAN** (Width) ..... • **CULVERT SLOPE** ..... Approx. 1 percent • **DOES IT CONTROL AN UPSTREAM POND, WETLAND, BACKWATER AREA, OR WATER RIGHT?** [d] ..... Yes ☒ No ☐
STREAM	• **AVERAGE UPSTREAM ACW** [e,f] ..... 4 ft. • **AVERAGE DOWNSTREAM ACW** [e,f] ..... 4 ft. • **UPSTREAM SLOPE** [g] ..... 0 (irrigation pond located upstream) • **DOWNSTREAM SLOPE** [g] ..... N/A • **DESCRIBE STREAMBED MATERIAL** ... Silt/organic material • **SIZE OF D_{100} ROCK** [h] ..... N/A
PROPOSED CROSSING	• **TYPE/SHAPE** [b] ..... Open bottomed culvert with parallel runner footings • **MATERIAL** [c] ..... Aluminum arch, concrete footings • **LENGTH** ..... Approx. 67 ft. • **INSIDE DIAMETER** (*if round*) ..... **OR** **INSIDE RISE** (Height) **AND** ..... 6-6” **INSIDE SPAN** (Width) ..... 9-0” • **CULVERT SLOPE** ..... 0.5 % • **BED HEIGHT – INLET** [i,j] ..... Approx. el. 2.2 (NAVD88) • **BED HEIGHT – OUTLET** [i,k] ..... Approx. el. 1.7 (NAVD88) • **BED SLOPE** [i] ..... 0.5 % • **BED MATERIAL** [i] (*describe and/or fill in %s*) . Native streambed material **% FINES** (*dirt, silt, sand*) ..... TBD (based on hydraulic design) **% SMALL ROCK** (*½-6” diameter*) ..... TBD (based on hydraulic design) **% LARGE ROCK** (*6”-D_{100}*) [h] ..... TBD (based on hydraulic design) **% OVER-SIZED ROCK** (D_{150}-D_{200}) [h] ... TBD (based on hydraulic design) • **BED PLACEMENT METHOD** [i] ..... mechanical • **BED RETENTION MEASURES** [i] ..... Embedded native stream bed material • **GRADE CONTROL MEASURES** [l] ..... Embedded native stream bed material • **ADDITIONAL STRUCTURES** [m] .....
CONSTRUCTION	• **DATE WORK WILL BEGIN** ..... • **DATE WORK WILL BE COMPLETED** .. • **DETAILS** [n] .....

MAINTENANCE	
	• **WILL THE CROSSING BE INSPECTED FOR DEBRIS AND BED RETENTION (WITHIN, BELOW, AND ABOVE THE CROSSING) AT LEAST ANNUALLY AND AFTER STORM EVENTS?** ..... Yes ☒ No ☐
	• **IF NEEDED, WILL REMEDIAL MEASURES BE TAKEN AS SOON AS POSSIBLE?** ..... Yes ☒ No ☐

[b] *e.g., bridge, open-bottomed arch, pipe arch/squashed, round, rectangular*

[c] *e.g., reinforced concrete, concrete, wood, plastic, corrugated metal, metal*

[d] *if "Yes", explain how these will be addressed in a separate attachment*

[e] *"ACW" is the active channel width, which is the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate; ordinary high water lines are not the same as the wetted width and are typically determined by changes on the bank in vegetation, changes in sediment size and/or color, water lines on the bank, trees, or leaves, or the point where debris (e.g., needles, leaves, twigs, cones) accumulation begins*

[f] *3 measurements 20 feet apart should be averaged; begin measurements approximately 10 ACWs from the inlet (upstream) or outlet (downstream) of the crossing if this distance is outside of the influence of existing artificial obstructions and prior to adjoining tributaries as you move away from the crossing (if not, take measures at locations which fulfill these requirements); indicate measurement locations on the* **Profile Design Drawing**

[g] *take measurements away from the crossing and at the point where ACW measurement begins*

[h] *D_{100} is the average diameter of the 10 largest, naturally-occurring rocks in the stream reach; $D_{150} = D_{100} \times 1.5$; $D_{200} = D_{100} \times 2$*

[i] *"bed" refers to the stream bed within or under the crossing structure*

[j] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's inlet*

[k] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's outlet*

[l] *these are measures outside of the crossing structure intended to prevent up- or downstream channel degradation, especially important to consider in locations where an existing smaller culvert is being replaced and there is the potential for upstream channel degradation (i.e., a "headcut") and associated off-site property or passage problems*

[m] *e.g., bed retention measures, weirs, baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures*

[n] *unless already described in an accompanying Department of State Lands Removal-Fill Application, include a description of a) temporary downstream passage, upstream passage, screening, and bypass measures, b) worksite isolation measures, c) fish salvage (note: an ODFW Fish Take Permit may be necessary), d) sediment and erosion control measures, and e) site restoration measures. For more details on Oregon Fill Removal Law see the Oregon Division of State Lands Removal-Fill Guide at* http://oregonstatelands.us/DSL/PERMITS/rfg.shtml .

ADDITIONAL INFORMATION

*Provide this information **only if** the bed within the proposed crossing is not as wide as the active channel width or will not be embedded.*

	High Design Flow [o]	Low Design Flow [p]
Flow [q] (cfs)		
Water Depth in Crossing (in.)		
Water Velocity in Crossing (fps)		
Water Drop [r] at Inlet (in.)		
Water Drop [r] at Outlet (in.)		
Pool Depth Below Outlet (in.)		
Water Drop [r] at Weirs/Baffles (in.)		
Pool Depth Below Weirs/Baffles (in.)		
Depth of Nappe [s] at Weirs/Baffles (in.)		

[o] *High Design Flow is the mean daily average stream discharge that is exceeded 5 percent of the time during the period when ODFW determines that native migratory fish require fish passage*

[p] *Low Design Flow is the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when ODFW determines that native migratory fish require fish passage*

[q] *attach a description of the methodology, calculations, and assumptions used to determine the high and low design flows*

[r] *drop should be measured from the upstream water surface elevation to the downstream water surface elevation*

[s] *the nappe is the water flowing over weirs/baffles*

DESIGN DRAWINGS

Please attach the following design drawings with the specified information on them.

☒ -- **PLAN**, including:
- active channel (i.e., ordinary high water or bankfull lines)
- existing crossing and additional structures
- proposed crossing and additional structures
- dimensions

☒ -- **PROFILE**, including:
- existing grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet [i.e., downstream end of crossing] to 10 ACWs upstream of the inlet [i.e., upstream end of crossing], at 5-foot intervals), including road
- existing crossing and additional structures
- proposed grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet to 10 ACWs upstream of the inlet, at 5-foot intervals), including road
- proposed crossing, bed, and additional structures
- dimensions
- location of **STREAM CHANNEL CROSS-SECTIONS** (see below), *ACW* measurements, and *Slope* measurements
- water surface elevations at high and low design flows for the proposed crossing, **if** the proposed crossing will not be as wide as the active channel width or will not be embedded

☐ -- **CROSS-SECTION OF PROPOSED CROSSING**, including bed details

☐ -- **STREAM CHANNEL CROSS-SECTIONS** *(2 cross-sections total, with one located downstream where the ACW measurements begin and one located upstream where the ACW measurements begin; measurements should be taken at 1-foot intervals perpendicular to the flow of the stream and should encompass the entire active channel plus 0.5 ACW on each side of the stream [for a total cross-section measurement of 2 x ACW]; measurements may be taken with survey equipment or by measuring the distance from a level line to the bottom of the streambed or ground)*

☐ -- **DETAILS OF ADDITIONAL STRUCTURES** *(e.g., grade control measures, bed retention measures, weirs/baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures)*

Please submit this application along with project design plans to the appropriate ODFW District Fish Biologist for the crossing's location. The complete application can also be sent electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

ODFW FISH PASSAGE APPROVAL #PA-00-0000
(insert name of project)

• *ODFW will use the following criteria to determine the level of review required.*

For ODFW Use Only

	YES	NO	N/A
1. Is the bed within the crossing as wide as the active channel:	☐	☐	☐
2. Is the bed within the culvert at the same slope, and at grades continuous with, the surrounding stream:	☐	☐	☐
3a. If the crossing is open-bottomed, is there 3 feet of vertical clearance between the active channel width elevation and the inside top of the crossing:	☐	☐	☐
OR			
3b. If the crossing is closed-bottomed, will bed depth within the culvert be 20-50% of the crossing height:	☐	☐	☐
4. Is the bed material that will be used sufficient to assure water depth will be similar to that in the surrounding stream (i.e., will not go sub-surface prematurely):	☐	☐	☐
5. Are the bed material or retention measures that will be used sufficient to assure that the bed will be maintained through time:	☐	☐	☐
6. If the crossing is longer than 40 feet, will partially-buried, over-sized rock be placed within the crossing's bed:	☐	☐	☐
7. Will the bed within the crossing be placed during construction:	☐	☐	☐
8. If trash racks are present, are they above the active channel width elevation and do vertical bars have at least 9 inches of clear space between them:	☐	☐	☐
9. If there is an upstream pond, wetland, or backwater area, has its desired state after construction been determined, and have these considerations been addressed in the design:	☐	☐	☐
10. Are upstream grade control measures satisfactory:	☐	☐	☐
11. Are the construction timing and measures adequate based on the location:	☐	☐	☐
12. Are there plans to maintain the crossing:	☐	☐	☐

- If all answers are "Yes" or "Not Applicable", this plan is eligible for approval by an ODFW biologist.
- If any answer is "No" or there are other concerns, consult with the Fish Passage Coordinator.

APPLICATION IDENTIFIER: (insert name of project & applicant) **ODFW # PA-00-0000**
DATE RECEIVED: (insert date)

APPROVED ☐ **SIGNATURE:** _____ **DATE:** _____

DENIED ☐ **TITLE:**

CONDITIONS:

ATTACHMENT D.3: TIDEGATE FORM

OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage Plan for a Road-Stream Crossing

- *If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.*
- *If your project includes multiple crossings, please complete this form for each crossing.*

APPLICANT INFORMATION

APPLICANT: Natalie Eades **TITLE:** Owner's Representative
ORGANIZATION: Jordan Cove Energy Project L.P.
ADDRESS: 111 SW 5th Ave., Suite 1100
CITY: Portland, **STATE:** OR **ZIP:** 97204
PHONE: 713-504-3933
FAX:
E-MAIL ADDRESS: neades@pembina.com
SIGNATURE: Natalie Eades **DATE:** 2/14/19

AUTHORIZED AGENT (*if any*): Jay Lorenz **TITLE:** Senior Scientist
ORGANIZATION: TRC
ADDRESS: 111 SW 5th Ave., Suite 1100
CITY: Portland **STATE:** OR **ZIP:** 97204
PHONE: 425-657-9052
FAX:
E-MAIL ADDRESS: jlorenz@trcsolutions.com
SIGNATURE: Jay Lorenz **DATE:** 14 Feb 2019

OWNER (*if different than Applicant*): **TITLE:**
ORGANIZATION:
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:
SIGNATURE: _____ **DATE:** _____

LOCATION

- **COUNTY** ..... Coos
- **ROAD** ..... Proposed maintenance road/pedestrian path
- **RIVER/STREAM** ..... Kentuck Slough
- **TRIBUTARY OF** ..... Coos Bay
- **BASIN** ..... 171003040306 (Coos Bay)
- **COORDINATES** [a] ..... Longitude: -123.17436 Latitude: 43.43048
- **LEGAL DESCRIPTION** ..... ¼ / ¼: NENE
  Section: 6 Tax Map #: 25S13W06C
  Township: 25S Tax Lot #: 0010000
  Range: 13W

[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

STREAM CROSSING INFORMATION

Please indicate measurement units where applicable and see footnotes for supporting descriptions of the information requested.

NEW CROSSING ☒
REPLACEMENT OF EXISTING CROSSING ☐
MODIFICATION OF EXISTING CROSSING ☐

EXISTING CROSSING	• **TYPE/SHAPE** [b] ..... N/A • **MATERIAL** [c] ..... • **LENGTH** ..... • **INSIDE DIAMETER** (*if round*) ..... **OR** **INSIDE RISE** (Height) **AND** ..... **INSIDE SPAN** (Width)..... • **CULVERT SLOPE** ..... • **DOES IT CONTROL AN UPSTREAM POND, WETLAND, BACKWATER AREA, OR WATER RIGHT?** [d] ..... Yes ☐ No ☐
STREAM	• **AVERAGE UPSTREAM ACW** [e,f] ..... N/A • **AVERAGE DOWNSTREAM ACW** [e,f] ..... N/A • **UPSTREAM SLOPE** [g] ..... N/A • **DOWNSTREAM SLOPE** [g] ..... N/A • **DESCRIBE STREAMBED MATERIAL** ... N/A • **SIZE OF D_{100} ROCK** [h] ..... N/A
PROPOSED CROSSING	• **TYPE/SHAPE** [b] ..... Tide gate bridge with 1 MTR gate and 1 side hinge gate • **MATERIAL** [c] ..... Concrete structure with metal gates • **LENGTH** ..... 21 ft. (measured perpendicular to flow) • **INSIDE DIAMETER** (*if round*) ..... **OR** **INSIDE RISE** (Height) **AND** ..... 10 ft. (each gate) **INSIDE SPAN** (Width)..... 8 ft. (each gate) • **CULVERT SLOPE** ..... N/A • **BED HEIGHT – INLET** [i,j] ..... N/A • **BED HEIGHT – OUTLET** [i,k] ..... N/A • **BED SLOPE** [i] ..... 0 • **BED MATERIAL** [i] (*describe and/or fill in %s*) . N/A **% FINES** (*dirt, silt, sand*) ..... **% SMALL ROCK** (*½-6" diameter*)..... **% LARGE ROCK** (*6"-D_{100}*) [h] ..... **% OVER-SIZED ROCK** (*D_{150}-D_{200}*) [h] ... • **BED PLACEMENT METHOD** [i]..... mechanical • **BED RETENTION MEASURES** [i] ..... N/A • **GRADE CONTROL MEASURES** [l] ..... N/A • **ADDITIONAL STRUCTURES** [m] ..... Riprap slope stabilization
CONSTRUCTION	• **DATE WORK WILL BEGIN**..... January 2020 • **DATE WORK WILL BE COMPLETED** .. January 2024 • **DETAILS** [n] .....

MAINTENANCE			
	• **WILL THE CROSSING BE INSPECTED FOR DEBRIS AND BED RETENTION (WITHIN, BELOW, AND ABOVE THE CROSSING) AT LEAST ANNUALLY AND AFTER STORM EVENTS?**	Yes ☒	No ☐
	• **IF NEEDED, WILL REMEDIAL MEASURES BE TAKEN AS SOON AS POSSIBLE?**	Yes ☒	No ☐

[b] *e.g., bridge, open-bottomed arch, pipe arch/squashed, round, rectangular*

[c] *e.g., reinforced concrete, concrete, wood, plastic, corrugated metal, metal*

[d] *if "Yes", explain how these will be addressed in a separate attachment*

[e] *"ACW" is the active channel width, which is the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate; ordinary high water lines are not the same as the wetted width and are typically determined by changes on the bank in vegetation, changes in sediment size and/or color, water lines on the bank, trees, or leaves, or the point where debris (e.g., needles, leaves, twigs, cones) accumulation begins*

[f] *3 measurements 20 feet apart should be averaged; begin measurements approximately 10 ACWs from the inlet (upstream) or outlet (downstream) of the crossing if this distance is outside of the influence of existing artificial obstructions and prior to adjoining tributaries as you move away from the crossing (if not, take measures at locations which fulfill these requirements); indicate measurement locations on the* **Profile Design Drawing**

[g] *take measurements away from the crossing and at the point where ACW measurement begins*

[h] *D_{100} is the average diameter of the 10 largest, naturally-occurring rocks in the stream reach; $D_{150} = D_{100} \times 1.5$; $D_{200} = D_{100} \times 2$*

[i] *"bed" refers to the stream bed within or under the crossing structure*

[j] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's inlet*

[k] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's outlet*

[l] *these are measures outside of the crossing structure intended to prevent up- or downstream channel degradation, especially important to consider in locations where an existing smaller culvert is being replaced and there is the potential for upstream channel degradation (i.e., a "headcut") and associated off-site property or passage problems*

[m] *e.g., bed retention measures, weirs, baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures*

[n] *unless already described in an accompanying Department of State Lands Removal-Fill Application, include a description of a) temporary downstream passage, upstream passage, screening, and bypass measures, b) worksite isolation measures, c) fish salvage (note: an ODFW Fish Take Permit may be necessary), d) sediment and erosion control measures, and e) site restoration measures. For more details on Oregon Fill Removal Law see the Oregon Division of State Lands Removal-Fill Guide at* http://oregonstatelands.us/DSL/PERMITS/rfg.shtml .

ADDITIONAL INFORMATION

*Provide this information **only if** the bed within the proposed crossing is not as wide as the active channel width or will not be embedded.*

	High Design Flow [o]	Low Design Flow [p]
Flow [q] (cfs)		
Water Depth in Crossing (in.)		
Water Velocity in Crossing (fps)		
Water Drop [r] at Inlet (in.)		
Water Drop [r] at Outlet (in.)		
Pool Depth Below Outlet (in.)		
Water Drop [r] at Weirs/Baffles (in.)		
Pool Depth Below Weirs/Baffles (in.)		
Depth of Nappe [s] at Weirs/Baffles (in.)		

[o] *High Design Flow is the mean daily average stream discharge that is exceeded 5 percent of the time during the period when ODFW determines that native migratory fish require fish passage*

[p] *Low Design Flow is the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when ODFW determines that native migratory fish require fish passage*

[q] *attach a description of the methodology, calculations, and assumptions used to determine the high and low design flows*

[r] *drop should be measured from the upstream water surface elevation to the downstream water surface elevation*

[s] *the nappe is the water flowing over weirs/baffles*

DESIGN DRAWINGS

Please attach the following design drawings with the specified information on them.

☒ -- **PLAN**, including:
- active channel (i.e., ordinary high water or bankfull lines)
- existing crossing and additional structures
- proposed crossing and additional structures
- dimensions

☒ -- **PROFILE**, including:
- existing grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet [i.e., downstream end of crossing] to 10 ACWs upstream of the inlet [i.e., upstream end of crossing], at 5-foot intervals), including road
- existing crossing and additional structures
- proposed grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet to 10 ACWs upstream of the inlet, at 5-foot intervals), including road
- proposed crossing, bed, and additional structures
- dimensions
- location of **STREAM CHANNEL CROSS-SECTIONS** (see below), *ACW* measurements, and *Slope* measurements
- water surface elevations at high and low design flows for the proposed crossing, **if** the proposed crossing will not be as wide as the active channel width or will not be embedded

☐ -- **CROSS-SECTION OF PROPOSED CROSSING**, including bed details

☐ -- **STREAM CHANNEL CROSS-SECTIONS** *(2 cross-sections total, with one located downstream where the ACW measurements begin and one located upstream where the ACW measurements begin; measurements should be taken at 1-foot intervals perpendicular to the flow of the stream and should encompass the entire active channel plus 0.5 ACW on each side of the stream [for a total cross-section measurement of 2 x ACW]; measurements may be taken with survey equipment or by measuring the distance from a level line to the bottom of the streambed or ground)*

☐ -- **DETAILS OF ADDITIONAL STRUCTURES** *(e.g., grade control measures, bed retention measures, weirs/baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures)*

Please submit this application along with project design plans to the appropriate ODFW District Fish Biologist for the crossing's location. The complete application can also be sent electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

ODFW FISH PASSAGE APPROVAL #PA-00-0000
(insert name of project)

• *ODFW will use the following criteria to determine the level of review required.*

For ODFW Use Only

	YES	NO	N/A
1. Is the bed within the crossing as wide as the active channel:	☐	☐	☐
2. Is the bed within the culvert at the same slope, and at grades continuous with, the surrounding stream:	☐	☐	☐
3a. If the crossing is open-bottomed, is there 3 feet of vertical clearance between the active channel width elevation and the inside top of the crossing:	☐	☐	☐
OR			
3b. If the crossing is closed-bottomed, will bed depth within the culvert be 20-50% of the crossing height:	☐	☐	☐
4. Is the bed material that will be used sufficient to assure water depth will be similar to that in the surrounding stream (i.e., will not go sub-surface prematurely):	☐	☐	☐
5. Are the bed material or retention measures that will be used sufficient to assure that the bed will be maintained through time:	☐	☐	☐
6. If the crossing is longer than 40 feet, will partially-buried, over-sized rock be placed within the crossing's bed:	☐	☐	☐
7. Will the bed within the crossing be placed during construction:	☐	☐	☐
8. If trash racks are present, are they above the active channel width elevation and do vertical bars have at least 9 inches of clear space between them:	☐	☐	☐
9. If there is an upstream pond, wetland, or backwater area, has its desired state after construction been determined, and have these considerations been addressed in the design:	☐	☐	☐
10. Are upstream grade control measures satisfactory:	☐	☐	☐
11. Are the construction timing and measures adequate based on the location:	☐	☐	☐
12. Are there plans to maintain the crossing:	☐	☐	☐

- If all answers are "Yes" or "Not Applicable", this plan is eligible for approval by an ODFW biologist.
- If any answer is "No" or there are other concerns, consult with the Fish Passage Coordinator.

APPLICATION IDENTIFIER: (insert name of project & applicant) **ODFW # PA-00-0000**
DATE RECEIVED: (insert date)

APPROVED ☐ **SIGNATURE:** _____ **DATE:** _____
DENIED ☐ **TITLE:**

CONDITIONS:

ATTACHMENT D.4: APCO BRIDGE FORM

OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage Plan for a Road-Stream Crossing

- *If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.*
- *If your project includes multiple crossings, please complete this form for each crossing.*

APPLICANT INFORMATION

APPLICANT:	Natalie Eades	**TITLE:**	Owner's Representative
ORGANIZATION:	Jordan Cove Energy Project L.P.		
ADDRESS:	111 SW 5th Ave., Suite 1100		
CITY:	Portland,	**STATE:** OR	**ZIP:** 97204
PHONE:	713-504-3933		
FAX:			
E-MAIL ADDRESS:	neades@pembina.com		

SIGNATURE: _____ **DATE:** _____

AUTHORIZED AGENT (*if any*):	Jay Lorenz	**TITLE:**	Senior Scientist
ORGANIZATION:	TRC		
ADDRESS:	111 SW 5th Ave., Suite 1100		
CITY:	Portland	**STATE:** OR	**ZIP:** 97204
PHONE:	425-657-9052		
FAX:			
E-MAIL ADDRESS:	jlorenz@trcsolutions.com		

SIGNATURE: Jay Lorenz **DATE:** 14 Feb 2019

OWNER (*if different than Applicant*):		**TITLE:**	
ORGANIZATION:			
ADDRESS:			
CITY:		**STATE:**	**ZIP:**
PHONE:			
FAX:			
E-MAIL ADDRESS:			

SIGNATURE: _____ **DATE:** _____

LOCATION

- **COUNTY** ..... Coos
- **ROAD** ..... Un-named channel to Coos Bay
- **RIVER/STREAM** ..... Coos Bay
- **TRIBUTARY OF** ..... Coos Bay
- **BASIN** ..... 171003040306 (Coos Bay)
- **COORDINATES** [a] ..... Longitude: -123.22880 Latitude: 43.42289
- **LEGAL DESCRIPTION** ..... ¼ / ¼: NW of NWNE
  Section: 10 Tax Map #: 25S13W10
  Township: 25S Tax Lot #: 1000
  Range: 13W

[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

STREAM CROSSING INFORMATION

Please indicate measurement units where applicable and see footnotes for supporting descriptions of the information requested.

NEW CROSSING ☒
REPLACEMENT OF EXISTING CROSSING ☐
MODIFICATION OF EXISTING CROSSING ☐

EXISTING CROSSING	• **TYPE/SHAPE** [b] ..... N/A • **MATERIAL** [c] ..... • **LENGTH** ..... • **INSIDE DIAMETER** (*if round*) ..... **OR** **INSIDE RISE** (Height) **AND** ..... **INSIDE SPAN** (Width)..... • **CULVERT SLOPE** ..... • **DOES IT CONTROL AN UPSTREAM POND, WETLAND, BACKWATER AREA, OR WATER RIGHT?** [d] ..... Yes ☐ No ☐
STREAM	• **AVERAGE UPSTREAM ACW** [e,f] ..... N/A (tidal estuary). HMT width at Bridge = Approx. 170' • **AVERAGE DOWNSTREAM ACW** [e,f] ..... N/A (tidal estuary) • **UPSTREAM SLOPE** [g] ..... 0 (tidal estuary) • **DOWNSTREAM SLOPE** [g] ..... 0 (tidal estuary) • **DESCRIBE STREAMBED MATERIAL** ... Silt/sand/tidal mudflats • **SIZE OF D_{100} ROCK** [h] ..... <1 in.
PROPOSED CROSSING	• **TYPE/SHAPE** [b] ..... Full span bridge • **MATERIAL** [c] ..... Steel plate girders and concrete drilled shafts • **LENGTH** ..... 200 ft. • **INSIDE DIAMETER** (*if round*) ..... N/A **OR** **INSIDE RISE** (Height) **AND** ..... 9-13 ft. between HMT and bridge beam **INSIDE SPAN** (Width)..... 19 feet • **CULVERT SLOPE** ..... N/A • **BED HEIGHT – INLET** [i,j] ..... N/A • **BED HEIGHT – OUTLET** [i,k] ..... N/A • **BED SLOPE** [i] ..... N/A • **BED MATERIAL** [i] (*describe and/or fill in %s*) . N/A **% FINES** (*dirt, silt, sand*) ..... N/A **% SMALL ROCK** (*½-6" diameter*)..... N/A **% LARGE ROCK** (*6"-D_{100}*) [h] ..... N/A **% OVER-SIZED ROCK** (D_{150}-D_{200}) [h] ... N/A • **BED PLACEMENT METHOD** [i]..... N/A • **BED RETENTION MEASURES** [i] ..... N/A • **GRADE CONTROL MEASURES** [l] ..... N/A • **ADDITIONAL STRUCTURES** [m] ..... Temporary work bridge with 15 24" piles within HMT
CONSTRUCTION	• **DATE WORK WILL BEGIN**..... January 2020 • **DATE WORK WILL BE COMPLETED**.. January 2024 • **DETAILS** [n] .....

MAINTENANCE			
	• WILL THE CROSSING BE INSPECTED FOR DEBRIS AND BED RETENTION (WITHIN, BELOW, AND ABOVE THE CROSSING) AT LEAST ANNUALLY AND AFTER STORM EVENTS?	Yes ☒	No ☐
	• IF NEEDED, WILL REMEDIAL MEASURES BE TAKEN AS SOON AS POSSIBLE?	Yes ☒	No ☐

[b] *e.g., bridge, open-bottomed arch, pipe arch/squashed, round, rectangular*

[c] *e.g., reinforced concrete, concrete, wood, plastic, corrugated metal, metal*

[d] *if "Yes", explain how these will be addressed in a separate attachment*

[e] *"ACW" is the active channel width, which is the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate; ordinary high water lines are not the same as the wetted width and are typically determined by changes on the bank in vegetation, changes in sediment size and/or color, water lines on the bank, trees, or leaves, or the point where debris (e.g., needles, leaves, twigs, cones) accumulation begins*

[f] *3 measurements 20 feet apart should be averaged; begin measurements approximately 10 ACWs from the inlet (upstream) or outlet (downstream) of the crossing if this distance is outside of the influence of existing artificial obstructions and prior to adjoining tributaries as you move away from the crossing (if not, take measures at locations which fulfill these requirements); indicate measurement locations on the* **Profile Design Drawing**

[g] *take measurements away from the crossing and at the point where ACW measurement begins*

[h] *D_{100} is the average diameter of the 10 largest, naturally-occurring rocks in the stream reach; $D_{150} = D_{100} \times 1.5$; $D_{200} = D_{100} \times 2$*

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[l] *these are measures outside of the crossing structure intended to prevent up- or downstream channel degradation, especially important to consider in locations where an existing smaller culvert is being replaced and there is the potential for upstream channel degradation (i.e., a "headcut") and associated off-site property or passage problems*

[m] *e.g., bed retention measures, weirs, baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures*

[n] *unless already described in an accompanying Department of State Lands Removal-Fill Application, include a description of a) temporary downstream passage, upstream passage, screening, and bypass measures, b) worksite isolation measures, c) fish salvage (note: an ODFW Fish Take Permit may be necessary), d) sediment and erosion control measures, and e) site restoration measures. For more details on Oregon Fill Removal Law see the Oregon Division of State Lands Removal-Fill Guide at* http://oregonstatelands.us/DSL/PERMITS/rfg.shtml .

ADDITIONAL INFORMATION

*Provide this information **only if** the bed within the proposed crossing is not as wide as the active channel width or will not be embedded.*

	High Design Flow [o]	Low Design Flow [p]
Flow [q] (cfs)		
Water Depth in Crossing (in.)		
Water Velocity in Crossing (fps)		
Water Drop [r] at Inlet (in.)		
Water Drop [r] at Outlet (in.)		
Pool Depth Below Outlet (in.)		
Water Drop [r] at Weirs/Baffles (in.)		
Pool Depth Below Weirs/Baffles (in.)		
Depth of Nappe [s] at Weirs/Baffles (in.)		

[o] *High Design Flow is the mean daily average stream discharge that is exceeded 5 percent of the time during the period when ODFW determines that native migratory fish require fish passage*

[p] *Low Design Flow is the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when ODFW determines that native migratory fish require fish passage*

[q] *attach a description of the methodology, calculations, and assumptions used to determine the high and low design flows*

[r] *drop should be measured from the upstream water surface elevation to the downstream water surface elevation*

[s] *the nappe is the water flowing over weirs/baffles*

DESIGN DRAWINGS

Please attach the following design drawings with the specified information on them.

☒ -- **PLAN**, including:
- active channel (i.e., ordinary high water or bankfull lines)
- existing crossing and additional structures
- proposed crossing and additional structures
- dimensions

☒ -- **PROFILE**, including:
- existing grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet [i.e., downstream end of crossing] to 10 ACWs upstream of the inlet [i.e., upstream end of crossing], at 5-foot intervals), including road
- existing crossing and additional structures
- proposed grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet to 10 ACWs upstream of the inlet, at 5-foot intervals), including road
- proposed crossing, bed, and additional structures
- dimensions
- location of **STREAM CHANNEL CROSS-SECTIONS** (see below), *ACW* measurements, and *Slope* measurements
- water surface elevations at high and low design flows for the proposed crossing, **if** the proposed crossing will not be as wide as the active channel width or will not be embedded

☐ -- **CROSS-SECTION OF PROPOSED CROSSING**, including bed details

☐ -- **STREAM CHANNEL CROSS-SECTIONS** *(2 cross-sections total, with one located downstream where the ACW measurements begin and one located upstream where the ACW measurements begin; measurements should be taken at 1-foot intervals perpendicular to the flow of the stream and should encompass the entire active channel plus 0.5 ACW on each side of the stream [for a total cross-section measurement of 2 x ACW]; measurements may be taken with survey equipment or by measuring the distance from a level line to the bottom of the streambed or ground)*

☐ -- **DETAILS OF ADDITIONAL STRUCTURES** *(e.g., grade control measures, bed retention measures, weirs/baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures)*

Please submit this application along with project design plans to the appropriate ODFW District Fish Biologist for the crossing's location. The complete application can also be sent electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

ODFW FISH PASSAGE APPROVAL #PA-00-0000
(insert name of project)

• *ODFW will use the following criteria to determine the level of review required.*

For ODFW Use Only

	YES	NO	N/A
1. Is the bed within the crossing as wide as the active channel:	☐	☐	☐
2. Is the bed within the culvert at the same slope, and at grades continuous with, the surrounding stream:	☐	☐	☐
3a. If the crossing is open-bottomed, is there 3 feet of vertical clearance between the active channel width elevation and the inside top of the crossing:	☐	☐	☐
OR			
3b. If the crossing is closed-bottomed, will bed depth within the culvert be 20-50% of the crossing height:	☐	☐	☐
4. Is the bed material that will be used sufficient to assure water depth will be similar to that in the surrounding stream (i.e., will not go sub-surface prematurely):	☐	☐	☐
5. Are the bed material or retention measures that will be used sufficient to assure that the bed will be maintained through time:	☐	☐	☐
6. If the crossing is longer than 40 feet, will partially-buried, over-sized rock be placed within the crossing's bed:	☐	☐	☐
7. Will the bed within the crossing be placed during construction:	☐	☐	☐
8. If trash racks are present, are they above the active channel width elevation and do vertical bars have at least 9 inches of clear space between them:	☐	☐	☐
9. If there is an upstream pond, wetland, or backwater area, has its desired state after construction been determined, and have these considerations been addressed in the design:	☐	☐	☐
10. Are upstream grade control measures satisfactory:	☐	☐	☐
11. Are the construction timing and measures adequate based on the location:	☐	☐	☐
12. Are there plans to maintain the crossing:	☐	☐	☐

- If all answers are "Yes" or "Not Applicable", this plan is eligible for approval by an ODFW biologist.
- If any answer is "No" or there are other concerns, consult with the Fish Passage Coordinator.

APPLICATION IDENTIFIER: (insert name of project & applicant) **ODFW # PA-00-0000**
DATE RECEIVED: (insert date)

APPROVED ☐ **SIGNATURE:** _____ **DATE:** _____

DENIED ☐ **TITLE:**

CONDITIONS:

Jordan Cove LNG
111 SW 5th Ave Suite 1100
Portland OR 97204
T 971.940.7800

www.jordancovelng.com

March 25, 2019

Sarah Reif
Energy Coordinator
Oregon Department of Fish and Wildlife
4034 Fairview Industrial Dr. SE
Salem, OR 97302

RE: Pacific Connector Gas Pipeline Project Fish Passage Plan for a Road-Stream Crossing – for a Temporary Bridge Installation at MP 44.29

Dear Ms. Reif:

Pacific Connector Gas Pipeline, LP (PCGP) has completed an assessment of the pipeline's proposed temporary and permanent roads, proposed road improvements, existing access roads and areas of pipeline construction within or immediately adjacent to roads (i.e., in road lay areas) that could potentially affect existing culverts within the Coastal Zone Management Area (CZMA). This assessment was conducted to determine if the pipeline project's road use or improvements would trigger Oregon Department of Fish and Wildlife (ODFW) fish passage requirements under Oregon Revised Statutes (ORS 509.580 - 901) and corresponding Administrative Rules (OAR 635-412-0005 - 0040). This assessment was conducted on the non-paved roads that would be used for access during construction between mileposts (MPs) 0.00 and 53.19 (see General Location Maps in Attachment 1). Based on this assessment, only the installation of a temporary bridge at MP 44.29 would require submittal of a Fish Passage Plan for a Road-Stream Crossing within the CZMA (provided with this letter).

With the attached application, PCGP provides the following to support the Fish Passage Road Assessment within the CZMA:

- An Excel spreadsheet (Table 1) summarizes the results of PCGP's fish passage road review assessment (see Attachment 1) and corresponds with the areas identified on the General Locations Maps (see Attachment 1) as the black dashed polygons with white MP callouts. Table 1 includes notes regarding the type of project action which warranted the review (i.e., existing road, road improvement, in road lay areas, etc.); review of waterbody crossings based on PCGP's field delineations, NHD data, ODF Fish Presence data; and notes from PCGP's field investigations. Table 2 lists the roads (also shown on the General Locations Maps in Attachment 1) that were not reviewed because they are existing, well-maintained BLM reciprocal rights arterial roads that provide the main access to large areas of private and federal forest lands and which would not be affected by Pipeline use; many are paved roads. In addition, public paved roads are not listed on Table 2.
- The General Location Maps (1:24,000 topo base maps) in Attachment 1 show all of the areas reviewed on the spreadsheet within the CZMA (depicted with black dashed polygons and white MP callouts).

- A shapefile file and KMZ file of PCGP's fish passage review areas within the CZMA; these files include attributes which are presented in Table 1.

If you have questions, please contact me at NEades@pembina.com or 971-940-9800. PCGP will be glad to arrange a meeting to discuss the materials to assist you in your review.

Sincerely,

Natalie Eades

Natalie Eades

Attachment

OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage Plan for a Road-Stream Crossing

- *If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.*
- *If your project includes multiple crossings, please complete this form for each crossing.*

APPLICANT INFORMATION

APPLICANT: Natalie Eades **TITLE:** Manager, Environmental & Regulatory
ORGANIZATION: Pacific Connector Gas Pipeline, LP
ADDRESS: 111 SW 5th Ave. Suite 1100
CITY: Portland, **STATE:** OR **ZIP:** 97204
PHONE: 971-940-7800
FAX:
E-MAIL ADDRESS: Neades@pembina.com
SIGNATURE: Natalie Eades **DATE:** 3/27/19

AUTHORIZED AGENT (*if any*): Jay Lorenz **TITLE:**
ORGANIZATION:
ADDRESS: 111 SW 5th Ave. Suite 1100
CITY: Portland **STATE:** OR **ZIP:** 97204
PHONE: 425-657-9052
FAX:
E-MAIL ADDRESS: jlorenz@pembina.com
SIGNATURE: Jay Lorenz **DATE:** 27MAR2019

OWNER (*if different than Applicant*): **TITLE:**
ORGANIZATION:
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:
SIGNATURE: _____ **DATE:** _____

LOCATION

- **COUNTY** ..... Coos
- **ROAD** ..... Plum Crk Logging Spur Upper Rock BLM 29-9-8.A/Plum Crk Logging Spur Upper Rock BLM 29-9-8.C (MP 44.17) - see General Location Map 3430-31-Y-Map 7 Sheet 11 of 55 in Attachment 1 at 44.29
- **RIVER/STREAM** ..... Reach Code = 17100305000252 Upper Rock Creek
- **TRIBUTARY OF** ..... Middle Fork Coquille River
- **BASIN** ..... South Coast
- **COORDINATES** [a] ..... Longitude: -123.79056 °W Latitude: 43.06012 °N
- **LEGAL DESCRIPTION** ..... NW¼SE¼:
  Section: 8 Tax Map #: 29S09000000600
  Township: 29S Tax Lot #: 1056600
  Range: 9W

[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

STREAM CROSSING INFORMATION

Please indicate measurement units where applicable and see footnotes for supporting descriptions of the information requested.

NEW CROSSING	☐
REPLACEMENT OF EXISTING CROSSING	X
MODIFICATION OF EXISTING CROSSING	☐

EXISTING CROSSING	• TYPE/SHAPE [b]	Previous culvert crossing removed. Current crossing is a low water ford (see Photo 1 Attachment 2)
	• MATERIAL [c]	CMP removed
	• LENGTH	~ 20 feet (removed)
	• INSIDE DIAMETER (*if round*)	2 @ ~ 24 inch (removed)
	OR	
	INSIDE RISE (Height) AND	Unknown
	INSIDE SPAN (Width)	Unknown
	• CULVERT SLOPE	N/A
	• DOES IT CONTROL AN UPSTREAM POND, WETLAND, BACKWATER AREA, OR WATER RIGHT? [d]	Yes ☐ No X
STREAM	• AVERAGE UPSTREAM ACW [e,f]	20 – 40 feet
	• AVERAGE DOWNSTREAM ACW [e,f]	30 – 40 feet
	• UPSTREAM SLOPE [g]	1%
	• DOWNSTREAM SLOPE [g]	1%
	• DESCRIBE STREAMBED MATERIAL	Cobble, gravel and sand
	• SIZE OF D_{100} ROCK [h]	
PROPOSED CROSSING	• TYPE/SHAPE [b]	Temporary Bridge
	• MATERIAL [c]	Wood (equipment) mat or railroad flatcar bridge
	• LENGTH	20-40 feet
	• INSIDE DIAMETER (*if round*)	The temporary bridge at MP 44.29 will be installed to be above the water surface at all times to maintain unrestricted flow, and pass the highest flow expected to occur while the bridge is in place. ODFW recommends 3-ft of freeboard from the Ordinary High Water Mark (OHWM) to the bottom of the bridge. The temporary bridges will be constructed to span the entire OHWM.
	OR	
	INSIDE RISE (Height) AND	
	INSIDE SPAN (Width)	
	• CULVERT SLOPE	N/A
	• BED HEIGHT – INLET [i,j]	N/A
	• BED HEIGHT – OUTLET [i,k]	N/A
	• BED SLOPE [i]	1%
	• BED MATERIAL [i] (*describe and/or fill in %s*)	Bed composition is predominantly cobble, gravel, and sand.
	% FINES (*dirt, silt, sand*)	
	% SMALL ROCK (*½-6" diameter*)	
	% LARGE ROCK (*6"-D_{100}*) [h]	
	% OVER-SIZED ROCK (D_{150}-D_{200}) [h]	
	• BED PLACEMENT METHOD [i]	N/A
	• BED RETENTION MEASURES [i]	N/A
	• GRADE CONTROL MEASURES [l]	N/A
	• ADDITIONAL STRUCTURES [m]	N/A

CONSTRUCTION	• DATE WORK WILL BEGIN.....	The temporary bridge will be installed during timber removal/clearing operations in 2020. The temporary bridge set during timber clearing operations would be removed after clearing is complete and will not be left in place across the waterbody over the winter, during periods of high seasonal flows. During mainline construction, the temporary bridge will be reset and will be removed as soon as possible after restoration and permanent seeding.
	• DATE WORK WILL BE COMPLETED..	
	• DETAILS [n].....	The temporary bridge will be removed after clearing and again after completion of pipeline construction through pipeline MP 44.17. The steep west and east slopes on the pipeline right-of-way within the Upper Rock Creek drainage (see General Location Map 3430-31-Y-Map 7 sheet 11 of 55 in Attachment 1) will require equipment and vehicles to be assisted by cables and winch to ascend/descend these slopes. The only access to the bottom of the Upper Rock Creek drainage is the proposed access road (Plum Crk Logging Spur Upper Rock BLM 29-9-8.A/Plum Crk Logging Spur Upper Rock BLM 29-9-8.C (MP 44.17) which requires the temporary bridge installation (MP 44.29) to minimize potential waterbody crossings impacts in lieu of using the existing low water ford crossing. Proposed road use will principally be light duty traffic to facilitate construction access for laborers, inspectors, welders, etc. The access road and bridge will also provide critical emergency access, if necessary, during timber clearing and pipeline construction. Timber, pipe, and other heavy equipment traffic would be yarded/hauled out along the construction right-of-way. Drawing B8300.01-13A-00003 in Attachment 3 provides a typical drawing of a temporary crossing bridge and includes the minimum performance/design standards PCGP's contractor will follow to ensure resource damage is minimized. At this crossing PCGP's contractors will lift, span, and set the bridge from the streambanks. However, if necessary to safely set the temporary bridge, the existing ford crossing will be used by one piece of equipment to reach the opposite bank to cross the waterbody to assist in setting/removing the temporary bridge. PCGP's EI, or authorized representative, will review the bridge placement to verify bridge safety and to ensure the performance standards are satisfied. The temporary bridge would not be left in place during the winter between timber clearing and construction, during periods of high seasonal flows.
MAINTENANCE	• WILL THE CROSSING BE INSPECTED FOR DEBRIS AND BED RETENTION (WITHIN, BELOW, AND ABOVE THE CROSSING) AT LEAST ANNUALLY AND AFTER STORM EVENTS?.....	Yes **X** No ☐
	• IF NEEDED, WILL REMEDIAL MEASURES BE TAKEN AS SOON AS POSSIBLE?.....	Yes **X** No ☐

[b] *e.g., bridge, open-bottomed arch, pipe arch/squashed, round, rectangular*

[c] *e.g., reinforced concrete, concrete, wood, plastic, corrugated metal, metal*

[d] *if "Yes", explain how these will be addressed in a separate attachment*

[e] *"ACW" is the active channel width, which is the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate; ordinary high water lines are not the same as the wetted width and are typically determined by changes on the bank in vegetation, changes in*

sediment size and/or color, water lines on the bank, trees, or leaves, or the point where debris (e.g., needles, leaves, twigs, cones) accumulation begins

[f] *3 measurements 20 feet apart should be averaged; begin measurements approximately 10 ACWs from the inlet (upstream) or outlet (downstream) of the crossing if this distance is outside of the influence of existing artificial obstructions and prior to adjoining tributaries as you move away from the crossing (if not, take measures at locations which fulfill these requirements); indicate measurement locations on the* **Profile Design Drawing**

[g] *take measurements away from the crossing and at the point where ACW measurement begins*

[h] *D_{100} is the average diameter of the 10 largest, naturally-occurring rocks in the stream reach; $D_{150} = D_{100} \times 1.5$; $D_{200} = D_{100} \times 2$*

[i] *"bed" refers to the stream bed within or under the crossing structure*

[j] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's inlet*

[k] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's outlet*

[l] *these are measures outside of the crossing structure intended to prevent up- or downstream channel degradation, especially important to consider in locations where an existing smaller culvert is being replaced and there is the potential for upstream channel degradation (i.e., a "headcut") and associated off-site property or passage problems*

[m] *e.g., bed retention measures, weirs, baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures*

[n] *unless already described in an accompanying Department of State Lands Removal-Fill Application, include a description of a) temporary downstream passage, upstream passage, screening, and bypass measures, b) worksite isolation measures, c) fish salvage (note: an ODFW Fish Take Permit may be necessary), d) sediment and erosion control measures, and e) site restoration measures. For more details on Oregon Fill Removal Law see the Oregon Division of State Lands Removal-Fill Guide at* http://oregonstatelands.us/DSL/PERMITS/rfg.shtml .

ADDITIONAL INFORMATION

*Provide this information **only if** the bed within the proposed crossing is not as wide as the active channel width or will not be embedded.*

	High Design Flow [o]	Low Design Flow [p]
Flow [q] (cfs)		
Water Depth in Crossing (in.)		
Water Velocity in Crossing (fps)		
Water Drop [r] at Inlet (in.)		
Water Drop [r] at Outlet (in.)		
Pool Depth Below Outlet (in.)		
Water Drop [r] at Weirs/Baffles (in.)		
Pool Depth Below Weirs/Baffles (in.)		
Depth of Nappe [s] at Weirs/Baffles (in.)		

[o] *High Design Flow is the mean daily average stream discharge that is exceeded 5 percent of the time during the period when ODFW determines that native migratory fish require fish passage*

[p] *Low Design Flow is the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when ODFW determines that native migratory fish require fish passage*

[q] *attach a description of the methodology, calculations, and assumptions used to determine the high and low design flows*

[r] *drop should be measured from the upstream water surface elevation to the downstream water surface elevation*

[s] *the nappe is the water flowing over weirs/baffles*

DESIGN DRAWINGS

Please attach the following design drawings with the specified information on them.

☐ -- **PLAN**, including:
- active channel (i.e., ordinary high water or bankfull lines)
- existing crossing and additional structures
- proposed crossing and additional structures
- dimensions

☐ -- **PROFILE**, including:
- existing grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet [i.e., downstream end of crossing] to 10 ACWs upstream of the inlet [i.e., upstream end of crossing], at 5-foot intervals), including road
- existing crossing and additional structures
- proposed grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet to 10 ACWs upstream of the inlet, at 5-foot intervals), including road
- proposed crossing, bed, and additional structures
- dimensions
- location of **STREAM CHANNEL CROSS-SECTIONS** (see below), *ACW* measurements, and *Slope* measurements
- water surface elevations at high and low design flows for the proposed crossing, **if** the proposed crossing will not be as wide as the active channel width or will not be embedded

☐ -- **CROSS-SECTION OF PROPOSED CROSSING**, including bed details

☐ -- **STREAM CHANNEL CROSS-SECTIONS** *(2 cross-sections total, with one located downstream where the ACW measurements begin and one located upstream where the ACW measurements begin; measurements should be taken at 1-foot intervals perpendicular to the flow of the stream and should encompass the entire active channel plus 0.5 ACW on each side of the stream [for a total cross-section measurement of 2 x ACW]; measurements may be taken with survey equipment or by measuring the distance from a level line to the bottom of the streambed or ground)*

☐ -- **DETAILS OF ADDITIONAL STRUCTURES** *(e.g., grade control measures, bed retention measures, weirs/baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures)*

PCGP RESPONSE: The design drawings for the temporary bridge installation at MP 44.29 are not included (or considered necessary) because, as previously noted, the temporary bridge will be constructed to maintain and pass, unrestricted, the highest flow expected to occur while the bridge is in place. The temporary bridge will span the entire OHWM of the waterbody. Drawing B8300.01-13A-00003 in Attachment 3 provides a standard drawing of a temporary crossing bridge and includes the minimum performance/design standards PCGP's contractor will follow to minimize any potential adverse effects to the waterbody. The crossing at MP 44.29 will be accomplished by PCGP from the streambanks without equipment crossing the waterbody. However, if necessary to safely set the temporary bridge, the existing ford crossing will be used by one piece of equipment, such as a track hoe, to reach the opposite bank to cross the waterbody to assist in setting/removing the bridge. PCGP's environmental inspector (EI), or authorized representative, will review the bridge placement to verify bridge safety and to ensure the performance standards are observed. The temporary bridge will be installed during timber removal/clearing operations. The temporary bridge set during clearing operations would be removed after clearing is complete and will not be left in place across the waterbody over the winter, during periods of high seasonal flows. During mainline construction the temporary bridge will be reset and will be removed as soon as possible after permanent seeding.

Please submit this application along with project design plans to the appropriate ODFW District Fish Biologist for the crossing's location. The complete application can also be sent electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

ODFW FISH PASSAGE APPROVAL #PA-00-0000
(PCGP Project)

• *ODFW will use the following criteria to determine the level of review required.*

For ODFW Use Only

	YES	NO	N/A
1. Is the bed within the crossing as wide as the active channel:	☐	☐	☐
2. Is the bed within the culvert at the same slope, and at grades continuous with, the surrounding stream:	☐	☐	☐
3a. If the crossing is open-bottomed, is there 3 feet of vertical clearance between the active channel width elevation and the inside top of the crossing:	☐	☐	☐
OR			
3b. If the crossing is closed-bottomed, will bed depth within the culvert be 20-50% of the crossing height:	☐	☐	☐
4. Is the bed material that will be used sufficient to assure water depth will be similar to that in the surrounding stream (i.e., will not go sub-surface prematurely):	☐	☐	☐
5. Are the bed material or retention measures that will be used sufficient to assure that the bed will be maintained through time:	☐	☐	☐
6. If the crossing is longer than 40 feet, will partially-buried, over-sized rock be placed within the crossing's bed:	☐	☐	☐
7. Will the bed within the crossing be placed during construction:	☐	☐	☐
8. If trash racks are present, are they above the active channel width elevation and do vertical bars have at least 9 inches of clear space between them:	☐	☐	☐
9. If there is an upstream pond, wetland, or backwater area, has its desired state after construction been determined, and have these considerations been addressed in the design:	☐	☐	☐
10. Are upstream grade control measures satisfactory:	☐	☐	☐
11. Are the construction timing and measures adequate based on the location:	☐	☐	☐
12. Are there plans to maintain the crossing:	☐	☐	☐

- If all answers are "Yes" or "Not Applicable", this plan is eligible for approval by an ODFW biologist.
- If any answer is "No" or there are other concerns, consult with the Fish Passage Coordinator.

APPLICATION IDENTIFIER: (insert name of project & applicant) **ODFW # PA-00-0000**
DATE RECEIVED: (insert date)

APPROVED ☐ **SIGNATURE:** _____ **DATE:** _____

DENIED ☐ **TITLE:**

CONDITIONS:

Attachment 1

General Location Maps and Tables

Table 1
Roads Included in PCGP's Road Assessment within Coastal Zone Management Area

(Name) Road Improvement/ In Road Lay Segment	Flow	MP	Road Note_1	PCGP Delineated Wetland / Waterbody (PCGP_Wet) [1/]	ODF - LLID[1/]	ODF_Fish [1/]	Field Investigation Field_Rev [1/]	Note_2	NHD Hydro Flowlines (NHD_Data) (Reach_CO_1) [1/]
Existing Road - Light duty use	1.0	3.5	Country Club Road - Floodplain Rd alignment.	S1-01 (EE-6) Trib to Coos; E-6 Trib to Coos (NW-117)	LLID:12419024342009	Fish, small, unknown	Yes	Existing golf course maintenance rd. (paved) with concrete bridge, which will be satisfactory for proposed light duty access. If other access is necessary, free spanning temporary bridge will be installed within TEWA 3.09-W (see pipeline fish passage).	17100304000767
Road improvement	2.0	6.44R	6ft cart path widen to 20 ft. Above floodplain & no waterbodies crossed.	None	LLID: None	None	Yes	No stream crossing identified.	None
Existing Logging Rd	3.0	7.88R-8.12R	7.88R-8.12R logging spur - above fish use.	DA-1 (MOD)	LLID: 1241649434037	Nonfish, small, intermittent	Yes	Existing structure on logging road (dirt) will not be affected by Pipeline use. Steep headwater drainage above fish use.	17100304015809
Existing Road	4.0	7.77R	Logging Spur 7.77R Gravel residential driveway / logging road.	SI-04 (EE-7 (MOD))	LLID: 1242083434031	Fish, Large, Perennial	No	Existing structure on gravel driveway/logging road adequate for all access. Road provides access to several residences - denied access parcel.	17100304001333
In road lay	4.2	6.65R - 7.6R	Logging Spur 6.64R - 7.34R Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment, no streams crossed - above fish use.	None
Existing Road	4.4	7.34R	Logging Rd 7.34R - (Private residential drive, logging and field access road). Existing bridge used recently for log hauling.	None	LLID: 1241714434314	Fish, Assumed, Perennial	Yes	Existing bridge used recently for log hauling. If necessary for bridge weight limits, will crib up a temporary railroad bridge over existing bridge deck with no in-water work (No Improvement).	17100304000264
Existing Road	4.6	7.34R	Logging Rd 7.34R - (Private residential drive, logging and field access road). Existing crossing used recently for log hauling.	None	LLID: 1241687434284	Fish, Small, Unknown	Yes	Logging Rd 7.34R - (Private residential drive, logging and field access road). Existing crossing used recently for log hauling.	17100304005027
In road lay	5.0	8.58R -8.97R	Logging Spur 8.91R - Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment, no streams crossed - above fish use.	None
Existing Road	5.1	9.40R	Unknown Rd. Weyerhaeuser - active gravel logging road in good condition/well maintained and above fish use.	None	LLIDs: 1241774433883; 1241958433889	Nonfish, small, intermittent; Nonfish, small, intermittent	Yes	Existing structures on active, good condition, well maintained gravel logging road (Weyerhaeuser) will not be affected by Pipeline use.	1710030405855, 17100304015765
In road lay	6.0	9.27R - 9.53R	Unknown Rd. (Weyerhaeuser - Logging Road) Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment, no streams crossed - above fish use.	None
In road lay	7.0	9.74R - 10.03R	Unknown Rd. (Weyerhaeuser - Logging Road) Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment, no streams crossed - above fish use.	None
Existing Road	8.0	9.40R & 10.20R	Noah Butte & Unknown Rd. Existing gravel logging road with existing structures to be used across non-fish tributaries.	SS-100-001 (GW-34),	LLIDs: 1241641433768; 1241585433800; 1241750433736; 1241499433823	Nonfish, small, perennial, Remaining 3 - Nonfish, small, intermittent	Yes	Pipeline use will not affect existing structures on nonfish drainages.	17100304001548, 17100304015698, 17100304005042, 17100304015692
In road lay	8.5	10.52R - 10.62R	Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	No waterbody crossings.	None
Existing Road	9.0	11.54BR	Private logging/field road crossing Vogel Creek - recently used for logging activity. Pipeline use will not affect existing structure.	SS-100-005 (BR-S-02) - Vogel Creek	LLID: 1241480433703	Fish, medium, perennial	No	Dirt/gravel surface logging/field road. Road recently used for logging by landowner. Pipeline use will not affect existing structure. Denied Access Parcel.	17100304005051
Existing Road	10.0	12.41BR	Private logging/field road- recently used for logging activity. Pipeline use will not affect existing structure.	BR-S-06	LLID: 1241292433647	Fish, small, intermittent	No	Dirt/gravel surface logging/field road. Road recently used for logging by landowner. Pipeline use will not affect existing structure. Denied Access Parcel.	17100304001945
In road lay	10.1	13.15BR - 14.42BR	Ridgeline alignment - above fish use (BLM 16-12-4.1; Lillian Crk 26-12-4.3, 26-12-4.4)	None	LLID: None	None	Yes	Ridgeline alignment above fish use. No stream crossing identified during wetland surveys.	None
PAR 15.07 to BVA No. 2	10.2	15.07BR	PAR 15.07 - to Block Valve No. 2 uses existing road to farm facility. Pipeline use will not affect existing structure.	BR-S-30	LLID: 1241378433330	Fish small, intermittent	No	Existing Rd. crossing structure to be used as is with no improvement necessary. Denied Access Parcel. (BVA #2 to be moved to Blue Ridge - Ridgeline)	17100304000493
Existing Road	10.22	15.68 BR	Private residential access/field road crossing Stock Slough. Pipeline use will not affect existing structure.	BR-S-36	LLID: 1241571433361	Fish, medium, intermittent	No	Residential gravel road. Pipeline use will not affect existing structure. Denied Access Parcel.	17100304005073
Existing Road	10.24	15.68BR	Unknown Logging Road 15.68BR. Existing crossing structure on nonfish intermittent drainage to be used.	None	LLID: 1241385433320	Non-fish, small, intermittent	No	Existing Rd and crossing from LiDAR appears adequate for use with no improvement necessary on nonfish intermittent drainage. Access denied parcel.	17100304002130
In road lay	10.3	16.09BR - 16.97BR	Ridgeline alignment - above fish use - BLM 26-12-15.2 and Unk Logging Rd.	None	LLID: None	None	No	Ridgeline alignment above fish use. Denied Access Parcel.	None
In road lay	10.4	16.97BR -17.65BR	Ridgeline alignment - above fish use - Blue Ridge (BLM 26-12-4.2)	None	LLID: None	None	Yes	Ridgeline alignment above fish use. No stream crossing identified during wetland surveys.	None
Existing Road	10.5	18.05BR	Daniels Tie (BLM 26-12-14.0)	None	LLID: None	Nonfish, small, intermittent	Yes	Existing gravel BLM road in good conditions and well maintained. Existing culvert will not be affected by Pipeline use.	17100304014829
In road lay	10.6	19.15BR - 19.65BR	Ridgeline alignment - above fish use - Blue Ridge (BLM 26-12-4.2)	None	LLID: None	None	Yes	Ridgeline alignment above fish use. No stream crossing identified during wetland surveys.	None
Existing Road	10.7	20.00BR	Blue Ridge System Road (BLM 26-15-35.1). Pipeline use will not affect existing culvert	None	LLID: 1240883432297	Fish, small, perennial	Yes	Gravel BLM Road in good condition and well maintained. Recently used for logging activity in the area and provides main access to communication tower complex on Blue Ridge. Pipeline use will not affect existing culvert.	17100305000361
Existing Road	10.8	20.00BR	Blue Ridge System Road (BLM 26-15-35.1). Pipeline use will not affect existing culvert above fish use.	None	LLID: 1240977432775, 1240885432749	Nonfish, small, Intermittent,	Yes	Gravel BLM Road in good condition and well maintained. Recently used for logging activity and provides main access to communication tower complex on Blue Ridge. Pipeline use will not affect existing culverts on nonfish headwater drainages	17100305001129, 17100305011697
In road lay	11.0	21.31BR - 22.15BR	Ridgeline alignment - above fish use - Blue Ridge (BLM 26-12-35.1)	None	LLID: None	None	Yes	Ridgeline alignment - above fish use. No stream crossing identified during wetland surveys.	None
In road lay	12.0	23.22BR - 23.59BR	Ridgeline alignment - above fish use - Unknown Road & Wood Crk Spur (BLM 27-12-14.2)	None	LLID: None	None	Yes	Ridgeline alignment - above fish use. No stream crossing identified during wetland surveys.	None
Existing Road	13.0	23.29 BR - 23.32BR	Unknown logging Rd. Pipeline use will not affect existing culverts.	None	LLID: 1240883432297; LLID: 1241021432395	Fish, medium, perennial - Steinnon Crk; Nonfish, small, intermittent	No	Existing crossing structures will not be affected by Pipeline use. Denied access parcel.	17100305000361, 17100305012104
Existing Road	14.0	23.32BR	Steinnon Crk Rd (BLM 27-12-15.0), Pipeline use will not affect existing culvert.	None	LLID: 1241012432365	Fish, small, perennial	Yes	Existing crossing structures will not be affected by Pipeline use. Main gravel arterial road for area.	17100305001467
Existing Road	15.0	24.00BR -24.14BR	Woodward Crk Rd (BLM 27-12-14.0), Pipeline use will not affect existing bridge.	BR-S-63	LLID: 1240883432297	Fish, medium, perennial	Yes	Existing road and bridge adequate for use. No improvement necessary.	17100305000361

Table 1
Roads Included in PCGP's Road Assessment within Coastal Zone Management Area

(Name) Road Improvement/ In Road Lay Segment	Flow	MP	Road Note_1	PCGP Delineated Wetland / Waterbody (PCGP_Wet) [1/]	ODF - LLID [1/]	ODF_Fish [1/]	Field Investigation Field_Rev [1/]	Note_2	NHD Hydro Flowlines (NHD_Data) (Reach_CO_1) [1/]
Existing Road	16.0	25.12BR	Powerline Access Rd (BLM 27-12-23.0) - Power Co. recently reconstructed road in this area. Waterbody is north and does not cross road.	None	LLID: 1240822432210	Nonfish, small, intermittent	No	Power Co. recently reconstructed road in this area. Waterbody shown in GIS (LLID: 1240822432210) does not cross road, the trib. is north of the road (LiDAR/Photos) - Denied access parcel.	17100305012036
Existing Road	16.5	25.12BR	Powerline Access Rd (BLM 27-12-23) - Power Co. recently reconstructed road in this area - Pipeline use will not affect existing culvert.	ESI-29, EE-SS-9028	LLIDs: 1240980432204; 1241003432184	Unknown, small, intermittent; Nonfish, small, intermittent;	Yes	Power Co. recently reconstructed road in this area. EE-SS-9028 (LLID 1240980432204) does not cross road. Road to be removed past right-of-way - not needed for Blue Ridge route	17100305011996, 17100305012206
Existing Road	17.0	25.12BR	Powerline Access Rd (BLM 27-12-23) - Power Co. recently reconstructed road in this area - Pipeline use will not affect existing culvert.	DA-9; NSP-15	LLIDs: 1241019432203; 1240848432002 (Steele Crk),	Fish, small, intermittent; Fish, medium, perennial	No	Power Co. recently reconstructed road in this area. Denied access parcel. Road to be removed from use - not needed for Blue Ridge route	17100305001646; 17100305000471
Existing Road	17.5	22.15	Powerline Access Road. Recently used for logging activity in the immediate area. - Pipeline use will not affect existing culvert on Nonfish drainage.	None	LLIDs: 1241009432189	Nonfish, small, intermittent	No	Road recently used for logging activity in the area. Denied access parcel. Road to be removed from use - not needed for Blue Ridge route	17100305011660
Existing Road	18.0	22.15	Powerline Access road, Pipeline use will not affect existing culvert.	None	LLID: 1240848432002 (Steele Creek)	Fish, medium, perennial	No	Road to be eliminated - not needed for Blue Ridge route. Powerline Access road, No road improvement - use existing crossing structures.	17100305000471
In road lay	18.5	22.15BR	Powerline Access Road - above fish use.	None	LLID: None	None	No	Ridgeline alignment - above fish use. Denied Access Parcel.	None
Existing Road	19.0	23.09	BLM 7-12-25 (Fisher Rd) Private residential driveway. Pipeline use will not affect existing culvert.	None	LLID: 1240725432094	Fish, small, intermittent	No	Private road to residence. Existing crossing structures will not be affected by Pipeline use. Denied Access Parcel.	17100305011590
In road lay / Existing Road	19.1	24.55 - 25.04	Logging Spur (BLM 27-11-30.03) & Private Logging Rd (BLM 27-11-30.1). Ridgeline alignment - above fish use.	None	LLID: 124780432008	Nonfish, Small, Intermittent	Yes	Ridgeline alignment and above fish use. No waterbodies delineated during wetland surveys.	17100305012294
In road lay	19.2	25.56 - 26.50	Menasha Private Logging Spur (BLM 27-11-32.A) Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use. No waterbodies delineated during wetland surveys.	None
Existing Road	19.5	26.65	Powerline Access Rd (BLM 28-11-5.4) - light duty use above fish use.	None	LLID: 1240393431793, 1240414431783	Nonfish, small, ephemeral, Nonfish, small, intermittent	Yes	Powerline access road partially used for recent logging activity. Existing crossing structures to be used. Headwater streams above fish use.	17100305012734, 17100305012611
Existing Road	20.0	27.53	BLM 28-11-4.1. Existing bridge to be used with no improvement necessary.	None	LLID: 1240139431744	Fish, large, perennial	Yes	Existing gravel access road with existing bridge structure to be used with no improvement necessary.	17100305000387
Existing Road	21.0	27.53	BLM 28-11-4.1. Pipeline use will not affect existing structures on nonfish drainages.	None	1240117431728; 1240140431714; 1240146431712; 1240184431729;	All - Nonfish, small, intermittent	Yes	5 - crossings of nonfish drainages, Pipeline use will not affect existing structures on nonfish drainages.	17100305002378, 17100305002393, 17100305012637, 17100305012634, 1710030512390
In road lay	21.1	27.64 - 28.14	Logging Rd Menasha (BLM 27-11-30.1). Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use. No waterbodies delineated during wetland surveys.	None
In road lay	21.2	28.29	Logging Spur (BLM 28-11-4.C). Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use. No waterbodies delineated during wetland surveys.	None
Existing Road	22.0	29.25	Lone Rock Logging Rd. Pipeline use will not affect existing structures.	BSI-73	LLID: None	Fish, small, perennial	Yes	Gravel Logging Road, existing crossing structures will not be affected by Pipeline use.	17100305002596
Existing Road	23.0	29.32	Logging Spur. Pipeline use will not affect existing structures.	BSI-73	LLID: None	Fish, small, perennial	Yes	Gravel Logging Road, existing crossing structures will not be affected by Pipeline use.	17100305002615
Existing Road	23.2	32.10	Dora Thinning Rd. (BLM 28-11-13.2). Pipeline use will not affect existing structures.	None	LLID: None	Fish, Medium, Perennial	Yes	Good condition gravel access road (BLM) with existing structure to be used as is, no improvement necessary.	17100305002863
Existing Road	23.5	32.10	Dora Thinning Rd (BLM 28-11-13)	None	LLID: None	Unknown, small, intermittent	Yes	Good condition BLM gravel road recently used for logging activities in the area. Existing structures will not be affected by Pipeline use. (steep headwater intermittent stream)	17100305018386
Existing Road	23.7	32.10 & 3151	Dora Thinning Rd (BLM 28-11-13) & Dora Spur Rd. (BLM 28-11-13.2)	BSI-69	LLID: None	Unknown, small, intermittent, Unknown, small, ephemeral	Yes	Good condition BLM gravel road recently used for logging activities in the area. Existing crossing structures will not be affected by Pipeline use. (steep headwater seasonal streams)	17100305002978, 17100305018951
In road lay	23.8	31.30-31.46	Logging Spur (BLM 28-11-14.A)	None	LLID: None	Nonfish, small, ephemeral	Yes	No streams observed/delineated in this area during wetland/waterbody surveys.	17100305018956, 17100305018097, 17100305018096, 17100305016589
Existing Road	23.9	31.30	Logging Spur (BLM Noni 28-11-14B)	None	LLID: None	Nonfish, Small, Intermittent	Yes	Existing logging road recently used for logging activity in the area, existing structure to be used as is on ephemeral headwater stream.	17100305016589
Bridge crossing	24.0	29.59	Laird - Private Rd, bridge crossing of E. F. Coquille River (Road to be removed from use - not needed).	BSP-71	LLID: None	Fish, large, perennial	Yes	Private bridge crossing of river - adequate for light duty use. (Road to be removed from use - Landowner)	17100305000286
Existing Road	25.0	32.35 & 32.50	Logging Spur (BLM 28-11-24.A) & Gold Brick Logging Road	BSI-59/BSI-59, BSP-57, S-T01-008 (BSP-55/WW-222-008)	LLID: None	Fish, Small, Intermittent; Fish, small, perennial; Fish, small, intermittent; Nonfish, small, intermittent	Yes	Existing gravel logging roads, Pipeline use will not affect existing culverted crossings. Gold Brick Road recently used for logging in the immediate area.	17100305021880, 17100305000284, 17100305003267
Existing Road	25.2	33.25	Unknown Rd (BLM 28-11-24.B) Pipeline use will not affect existing structures on headwater nonfish drainages.	None	LLID: None	Nonfish, small, intermittent	Yes	Existing logging road recently used for logging activities in the immediate area, Pipeline use will not affect existing structures nonfish headwater drainages.	17100305003314, 17100305003349
In road lay	25.3	33.78	Elk Mountain Loop (BLM 28-11-25) - Paved. Ridgeline alignment and above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use. No waterbody delineated during wetland/waterbody surveys.	None
Existing Road	25.4	34.31 & 34.42	Gold Brick Rd. & Logging Rd (BLM 28-10-19.B)	None	LLID: None	Nonfish, small, intermittent	Yes	No waterbody delineated during wetland/waterbody surveys,	None
Existing Road	25.6	34.69	Logging Rd. Pipeline use will not affect existing culverted crossings.	None	LLID: None	Nonfish, small, perennial	Yes	Existing gravel access road in good condition, Pipeline use will not affect existing culverted crossings.	17100305003720
In road lay / Existing Road	25.7	34.68 - 35.11	Logging Spur (BLM 28-10-30.A) Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
Existing Road	25.8	34.69	Logging Rd. Pipeline use will not affect existing culverted crossings.	None	LLID: None	Fish, small, intermittent, Nonfish, small, intermittent	Yes	Existing gravel access road in good condition, Pipeline use will not affect existing culverted crossings..	17100305003694, 17100305021822

Table 1
Roads Included in PCGP's Road Assessment within Coastal Zone Management Area

(Name) Road Improvement/ In Road Lay Segment	Flow	MP	Road Note_1	PCGP Delineated Wetland / Waterbody (PCGP_Wet) 1/	ODF - LLID 1/	ODF_Fish 1/	Field Investigation Field_Rev 1/	Note_2	NHD Hydro Flowlines (NHD_Data) (Reach_CO_1) 1/
In road lay	26.0	35.32 - 36.19	Elk Creek Rd (BLM 28-11-29) paved arterial road headwater alignment. BLM noted delineated crossings are nonfish bearing.	BSI-251, BLM-35.87 (CSP-2)	LLID: None	Unknown, small, intermittent, Nonfish, small, intermittent;	Yes	Main arterial paved BLM road. BLM confirmed only two culverted nonfish features in this in road lay area associated delineated streams - BSI-251 and BLM-35.87 (CSP-2). Included in PCGP Fish Passage Application for the Pipeline Crossings within the CZMA.	17100305025510, 17100305025781, 17100305021782, 17100305021783
In road lay	27.0	36.64 - 37.23	Elk Creek Rd (BLM 28-11-29) paved arterial road headwater alignment. BLM noted delineated crossings are nonfish bearing.	BSI-252, ESI-19	LLID: None	Unknown, small, intermittent; Unknown, small, intermittent; Nonfish, small, ephemeral; Nonfish, small, intermittent;	Yes	Main arterial paved BLM road. BLM confirmed only nonfish features in this in road lay area associated delineated streams - BSI-252, ESI-19. Included in PCGP Fish Passage Application for the Pipeline Crossings within the CZMA.	17100305025972, 1710030502548, 17100305004061, 17100305026171
In road lay	27.1	38.34 - 39.08	Weaver Sitkum Tie (BLM 28-10-9.4) - Paved. Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
In road lay	27.2	39.17 - 39.88	Weaver Sitkum Tie (BLM 28-10-9.4) - Paved. Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
In road lay	27.3	40.36	Weaver Sitkum Tie (BLM 28-10-9.4) - Paved. Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
In road lay	27.4	40.80 - 41.50	Weaver Sitkum Tie (BLM 28-10-9.4) - Paved. Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
In road lay	27.5	42.00 - 42.50	Weaver Road (28-8-18) - Paved. Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
In road lay	27.6	43.04 - 44.02	Lone Rock Logging Spur (BLM 29-9-8.B). Ridgeline alignment - above fish use	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
Temporary bridge at existing crossing ford	28.0	44.29	Install Temporary Bridge Upper Rock Creek - BSP-41.	BSP-41	LLID: None	Fish, large, perennial	Yes	Temporary Bridge to be installed at existing crossing (ford). See Fish Passage Application for typical bridge installation.	17100305000252
In road lay	28.1	44.51 - 45.24	BLM 29-9-9.3. Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
In road lay	28.15	45.83 - 46.55	Plum Creek Logging (Spur). Ridgeline alignment - above fish use.	None	LLID: None	None	Yes	Ridgeline alignment and above fish use.	None
Existing Road	28.2	47.10	Holmes Creek Spur (BLM 29-9-15.1) to be used as is - No improvement within occupied MAMU stand. steep intermittent headwater drainages above fish use.	None	LLID: None	Nonfish, Small, Intermittent, Nonfish, Small, Intermittent,	Yes	Gravel road to be used as is with no improvement (within occupied MAMU Stand and NSO core) steep intermittent headwater drainages above fish use.	17100305022427, 17100305022756
In road lay	28.3	47.30 - 47.73	Bingham Holms Road (BLM 29-9-15.8). Ridgeline alignment - above fish use.	None	None	None	Yes	Ridgeline alignment and above fish use.	None
Existing Road	28.4	48.16	Wildcat Creek Spur (BLM 29-9-14.A) Road is in good condition and well maintained - existing culvert will not be affected by Pipeline use.	None	LLID: None	Nonfish, Small, Intermittent, Nonfish, Small, Intermittent,	Yes	Gravel logging road in good condition used during recently logging activities in this area. Existing culverts will not be affected by Pipeline use - headwater intermittent nonfish drainages.	17100305022627, 17100305022871
Existing Road	28.6	48.16	Wildcat Creek Spur (BLM 29-9-14.A). Road is in good condition and well maintained - existing culvert will not be affected by Pipeline use.	None	LLID: None	Nonfish, Small, Intermittent,	Yes	Gravel logging road in good condition used during recently logging activities in this area. Existing culvert will not be affected by Pipeline use - headwater intermittent nonfish drainage.	17100305022853
In road lay	29.0	48.2 - 49.13	BLM 29-9-12.1 Deep Creek. Road is in good condition and well maintained - existing culvert will not be affected by Pipeline use.	BSP-257- Deep Creek	LLID: None	Fish, small, intermittent; Nonfish, small, intermittent	Yes	Well maintained gravel access road in good conditions recently used for logging activity in the area and no improvement necessary. Existing culverts will not be affected by Pipeline use.	17100305005863, 17100305022352
Existing Road	29.5	48.21-48.54	Deep Creek (BLM 29-9-12.1). Road is in good condition and well maintained - existing culvert will not be affected by Pipeline use.	None	LLID: None	Nonfish, small, intermittent	Yes	Deep Creek (BLM 29-9-12.1) well maintained gravel access road in good conditions recently used for logging activity in the area and no improvement necessary. Existing culverts on headwater nonfish drainage will not be affected by Pipeline use.	17100305005749
In road lay	30.0	50.55 - 50.75	Barnes private Rd, dirt/gravel. Existing culverts will not be affected by Pipeline use.	GSI-37 (BSP-61)	LLID: None	Fish, small, perennial	No	Actively used private logging/field road. Existing culverts will not be affected by Pipeline use. Denied Access Parcel. Alternate access is along the adjacent right-of-way - see Fish Passage App for Pipeline within CZMA.	17100305000706
Existing Road	30.2	52.8	Camas Mountain SP (BLM 29-8-9.3). Road is in good condition and well maintained - existing culverts will not be affected by Pipeline use.	None	LLID: None	Nonfish, small, intermittent, Nonfish, small, intermittent	Yes	Camas Mountain SP (BLM 29-8-9.3) good, well maintained road. Existing culverts (intermittent nonfish headwater drainages) will not be affected by Pipeline use.	17100305022789, 17100305005911

*1/ Shapefile & KML Attribute Name
*Note: Temporary Access Roads (TAR) 27.06, and 29.92; Permanent Access Roads (PAR) 29.48, and 48.41 to Block Valve No. 4 and 5, respectively and the two curve widenings on the Logging Road at MP 34.69 would not cross/affect known waterbodies.
*Flow: Approximate MP order along the PCGP centerline.
*Road Improvement/In Road Lay Segments: General description of the project action area identified for review. In-road lay areas are generally where the pipeline right-of-way encompasses a road where culverts could be located and impacted by construction.
*MP: Approximate MP ranges of review area polygons which are also shown on the General Locations Maps in Attachment 1 as a white callout.
*Note_1: Road Map Name on the General Location Maps in Attachment 1 with general road review notes.
*PCGP Delineated Wetland/Waterbody (PCGP_Wet): This attribute indicates if a wetland or waterbody was delineated during PCGP wetland and waterbody surveys. Features names are provided where delineated.
*The Oregon Department of Forestry (ODF) hydrography coverage (http://www.oregon.gov/odf/pages/gis/gisdata.aspx) LLID No. where provided.
*ODF Fish Presence (ODF_Fish): Fish Presence info from Oregon Department of Forestry (http://www.oregon.gov/odf/pages/gis/gisdata.aspx) include stream size and flow regime (perennial, intermittent or ephemeral).
*Field Investigation (Field_Rev): is the shapefile / KML attribute name. Indicates if PCGP's field representatives reviewed the road and provided general information regarding the road condition.
*Notes_2: Provides additional road information.
*Reach_Co_1: USGS, National Hydrograph Data Set Reach Code unique identification No.

Table 2
Roads not Included in PCGP's Road Assessment within Coastal Zone Management Area

Road Map Name	Milepost	Map Sheet # of 55
Blue Ridge Rd (BLM 26-12-4.2)	16.97BR-18.14BR & 20.05	2,3
Blue Ridge System (BLM 26-12-35.1)	21.50BR-22.16BR	3
BLM – Yankee Run Manline (BLM 28-11-20.0)	28.06	6,7
Elk Creek Road (BLM 28-11-29.0)	34.02 (35.33 - 35.80)	7,8,10
Elk Creek Ex (BLM 28-10-31.0)	35.8	8,9
Big Creek Rd. (29-11-28)	38.87 / 35.34-35.80	8, 9
Sandy Creek Ext. (29-10-2.1 & 28-10-34.1)	38.87	8
Sandy Creek Road (BLM 28-10-15 & 29-10-14.2)	38.87	8, 9, 11
Weaver Sitkum Tie (BLM 28-10-9.4)	38.34-38.87; 40.68; 40.27-40.37	8,10,11
Chaney Rd. (BLM 28-10-9)	38.34-38.87	10
North Rock Creek Road (BLM 30-10-3)	43.44	12, 13
Big Creek Rd. (BLM 29-11-18)	35.34-35.80	9
North Rock Creek Rd. (BLM 30-10-3)	43.29-43.45; 43.44	11, 12
Weaver Road (BLM 28-18-18)	42.03-42.50	11,14,17
Lower Signal Tree Rd (BLM 29-9-36)	46.51	12,13,15,16
Upper Signal Tree Rd (BLM 29-9-35)	44.87-45.23; 45.85-45.92	11,15,17
S Fk Camas Creek Rd (BLM 29-9-5.A, 28-9-32.2, 28-9-32, 28-9-20)	42.74-42.86	11,14
Camas Creek Rd (BLM 28-10-12)	42.74-42.86	14
Camas Tie Rd (BLM 29-9-25.1)	42.74-42.86	
Quiet Mountain Rd.	51.54	15
Camas Weaver Tie Rd (BLM 29-9-25.1)	49.8	17

Trans Pacific Hwy (Cnty Rd 218)
0.12

Jordan Cove Rd
0.12

Unknown Rd
0.12

Private Rd
0.12

US Hwy 101
1.23

Southern Pacific Railroad
0.36

JORDAN COVE DELIVERY
METER STATION
BLOCK VALVE NO. 1
0.00

HYDROSTATIC TEST
WATER SOURCE & DISCHARGE
0.00

Kentuck Slough Rd (Kentuck Way Ln)
3.02

Widened 6ft Cart Path to 12ft

Country Club Rd
6.44 R

Chapelle Pkwy
1.34

7.34R

HYDROSTATIC TEST BREAK
6.63R

7.34R

Logging Spur
6.68 R

Logging Rd
7.34 R

7R

6.65R -
7.6R

6.44R

Country
Club Rd
6.34 R

Carlson Heights Rd
7.34 R - 7.44R

Logging Spur
8.17 R

7.88R-8.12R

8R

Logging Spur
7.88 R - 8.12R

Logging Spur
6.64 R - 7.34R

Logging Spur
7.77 R

7.77R

Willanch Slough
8.44 R

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

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DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 1.47-R TO M.P. 8.38-R
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED		
CHECKED BY: EE	DATE: 3/1/2019	ISSUED FOR CONSTRUCTION:			
APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 1	SHEET 1 OF 55		

Unknown Rd
9.51 R - 9.82R

Unknown Rd
9.27 R - 9.51R

Logging Spur
9.11 R

9.27R - 9.53R

9 R

8.58R -8.97R

Willanch Slough
8.44 R

7.77R

Logging Spur
8.93 R

HYDROSTATIC TEST BREAK
10.13BR

Unknown Rd
10.20 R

Unknown Rd
9.82 R -
10.02R

9.74R -
10.03R

10 R

10.52R -
10.62R

11R

Unknown Rd
10.54 R - 10.61R

Private Rd
10.96 R

State 241
(Coos River Hwy)
11.07 R

Cnty Rd 6
(South Coos River Rd)
11.18 R

Noah
Butte Rd
9.40 R

9.40R &
10.20R

Unknown Rd
9.40 R

9.40R

11.54BR

12 BR

12.41BR

Private Rd
11.54 BR

Private Logging/Field Rd.
12.41 BR

BLM 26-12-4.1
13.15 BR - 13.66 BR

13 BR

Lillian Crk (BLM 26-12-4.3)
13.66 BR - 13.83 BR

BLM 26-12-4.4
13.83 BR - 14.42 BR

13.15BR -
14.42BR

14 BR

Stock Slough (BLM 26-12-4.0)
15.10 BR

Blue Ridge Rd
(BLM 26-12-4.2)
16.97BR - 18.14BR

15.07BR

BLOCK VALVE NO. 2
15.07

15 BR

PAR-15.07
15.07

16 BR

15.68 BR

15.68BR

Unknown
Private Rd
15.68 BR

Cnty Rd 54 (Stock Slough Rd)
15.10 BR

N

0 1,000 2,000 4,000 6,000 Feet

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

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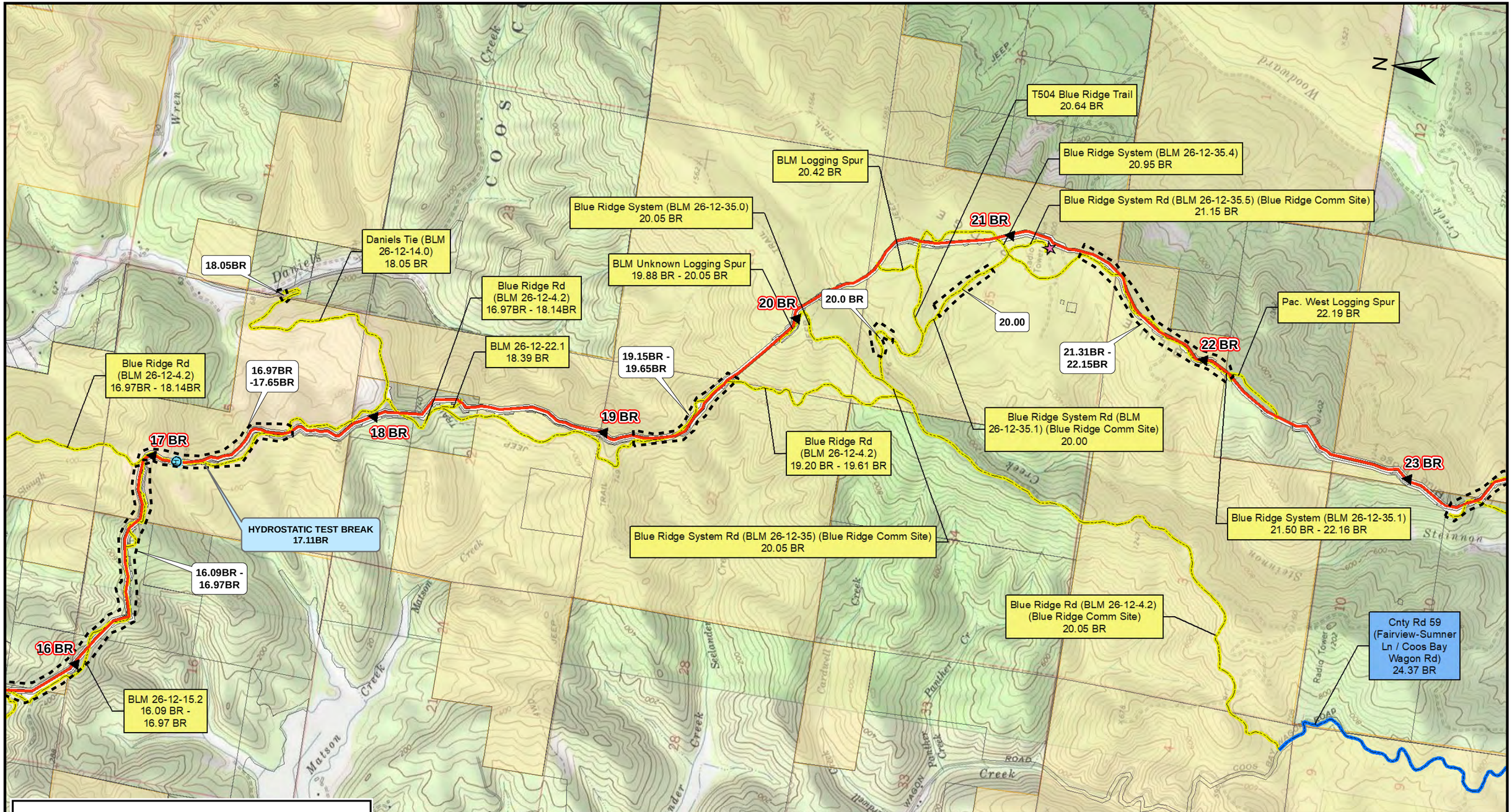
DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 8.38-R TO M.P. 15.90-BR
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED		
CHECKED BY: EE	DATE: 3/1/2019	ISSUED FOR CONSTRUCTION:			
APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 2	SHEET 2 OF 55		



DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 15.90-BR TO M.P. 23.00-BR
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: EE	DATE: 3/1/2019	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 3	SHEET 3 OF 55

See Map 3

N

Private Rd
14.23

AQUEDUCT LAKE
POTENTIAL DUST CONTROL
WATER SOURCE

Coos City -
Sumner Rd
14.23

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

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DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 15.90-BR TO M.P. 23.00-BR
COOS COUNTY

Pacific Connector GAS PIPELINE

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED
CHECKED BY: EE	DATE: 3/1/2019	ISSUED FOR CONSTRUCTION:	
APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 3a	SHEET 4 OF 55

Cnty Rd 63 (Coos Bay Wagon Rd)
24.55

Logging Spur (BLM 27-11-30.03)
24.99 - 25.14

25.56 - 26.50

Hudson Rdg Tie (BLM 27-11-17.1)
24.36

Powerline Access Rd
23.99

24.55 - 25.04

Private Logging Rd (BLM 27-11-30.1)
24.55 - 24.81

Hudson Ridge Tie (BLM 27-11-17.1)
24.36

Fisher Rd (Private) (BLM 7-12-25.03)
23.09

Unknown Rd
23.90

Cnty Rd 59 (Fairview-Sumner Ln / Coos Bay Wagon Rd)
24.37 BR

Cnty Rd 60 (Coos Bay Wagon Rd)
24.10

Powerline Access Rd
22.39

Powerline Access Rd (BLM 27-12-23.0)
25.12 BR

Woodward Crk Spur (BLM 27-12-14.2)
23.42 BR - 23.53 BR

Private Logging Rd
24.37 BR

BLM 27-12-14.1
24.50 BR

Woodward Crk Rd (BLM 27-12-14.0)
24.00 BR - 24.14 BR

24.00BR -24.14BR

25.12BR

Unknown Rd
23.22

Fisher Rd (Private) (Includes BLM 7-12-25)
23.09

Powerline Access (BLM 27-12-14.1)
21.98

22.00

Private Rd
22.57

Cnty Rd 9C (Fairview-Laverne Park Rd)
22.58

23.22BR - 23.59BR

23.29 BR - 23.32 BR

Cnty Rd 59 (Fairview-Sumner Ln / Coos Bay Wagon Rd)
24.37 BR

25.12BR

23.32BR

Private Logging Spur
24.72 BR

22.15

Powerline Access Rd (BLM 27-12-23)
25.12 BR

Powerline Access
22.15

22.15

Powerline Access
22.15

25.12BR

22 BR

23 BR

24 BR

25 BR

22

23

24

25

26

23.09

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
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- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

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DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 23.00-BR TO M.P. 25.31
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED		
CHECKED BY: EE	DATE: 3/1/2019	ISSUED FOR CONSTRUCTION:			
APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 4	SHEET 5 OF 55		

Powerline Access Rds (BLM 27-11-30.3) 25.15

Logging Sp 25.29

Logging Sp 25.31

Powerline Access Rds (BLM 27-11-30.3) 25.15

Menasha Private Logging Spur (BLM NonInv 27-11-32.A) 26.08 - 26.65

Menasha Private Logging Spur (BLM NonInv 27-11-32.C) 26.08 - 26.65

25.56 - 26.50

Logging Rd Menasha (BLM 27-11-30.1) 25.60 - 26.07

Logging Spur 26.65 - 26.75

Dora Ridge Rd (BLM 28-11.3.1) 28.50

Laird - Private Rd 29.59

BLM 28-11-4.1 27.53

27.53

Cnty Rd 13 (Lee McKinley Rd) (Middle Creek Rd) 26.95

27.53

Powerline Access Rd (BLM NonInv 27-11-32.A) 26.65

BLM 28-11-5.2 26.95-26.99

Cnty Rd 1C (Myrtle Point - Sitkum Rd) 29.59

Powerline Access Rd (BLM 28-11-5.4) 26.65

Lone Rock Logging Rd 29.25

29.59

Gold Brick Rd 32.10

32.10

26.65

27.64 - 28.14

Lone Rock Logging Rd 29.25

TAR-29.92 29.92

BLOCK VALVE NO. 3 29.50

29.25

TAR-27.06 27.06

28.29

29.32

PAR-29.48 29.48

Logging Spur (BLM NonInv 28-11-14.B) 31.30

Dora Spur Rd (BLM 28-11-13.2) 31.51

32.10

BLM 28-11-4.1 27.07

31.30-31.46

Logging Rd (BLM NonInv 28-11-4.A) 27.53

31.30

Logging Sp 29.32

Logging Rd (BLM NonInv 28-11-4.B) 27.68

BLM 28-11-9.5 29.02

Logging Rd (BLM NonInv 28-11-4.A) 27.67 - 28.12

BLM 28-11-9 29.02

Logging Spur (BLM NonInv 28-11-14.C) 30.38 - 31.19

Logging Rd 27.86 - 27.94

Logging Spur (BLM NonInv 28-11-4.C) 28.35

Logging Spur (BLM NonInv 28-11-14.A) 31.30 - 31.46

Back Dora (BLM 28-11-13.6) 31.69 - 31.81

BLM 28-11-9.6 28.06

Yankee Run Mainline (BLM 28-11-20) 28.06

See Map 5a

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 25.31 TO M.P. 31.86
COOS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
0	May - 2017	EE	Issued for FERC Pre-Filing			

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APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 5	SHEET 6 OF 55		

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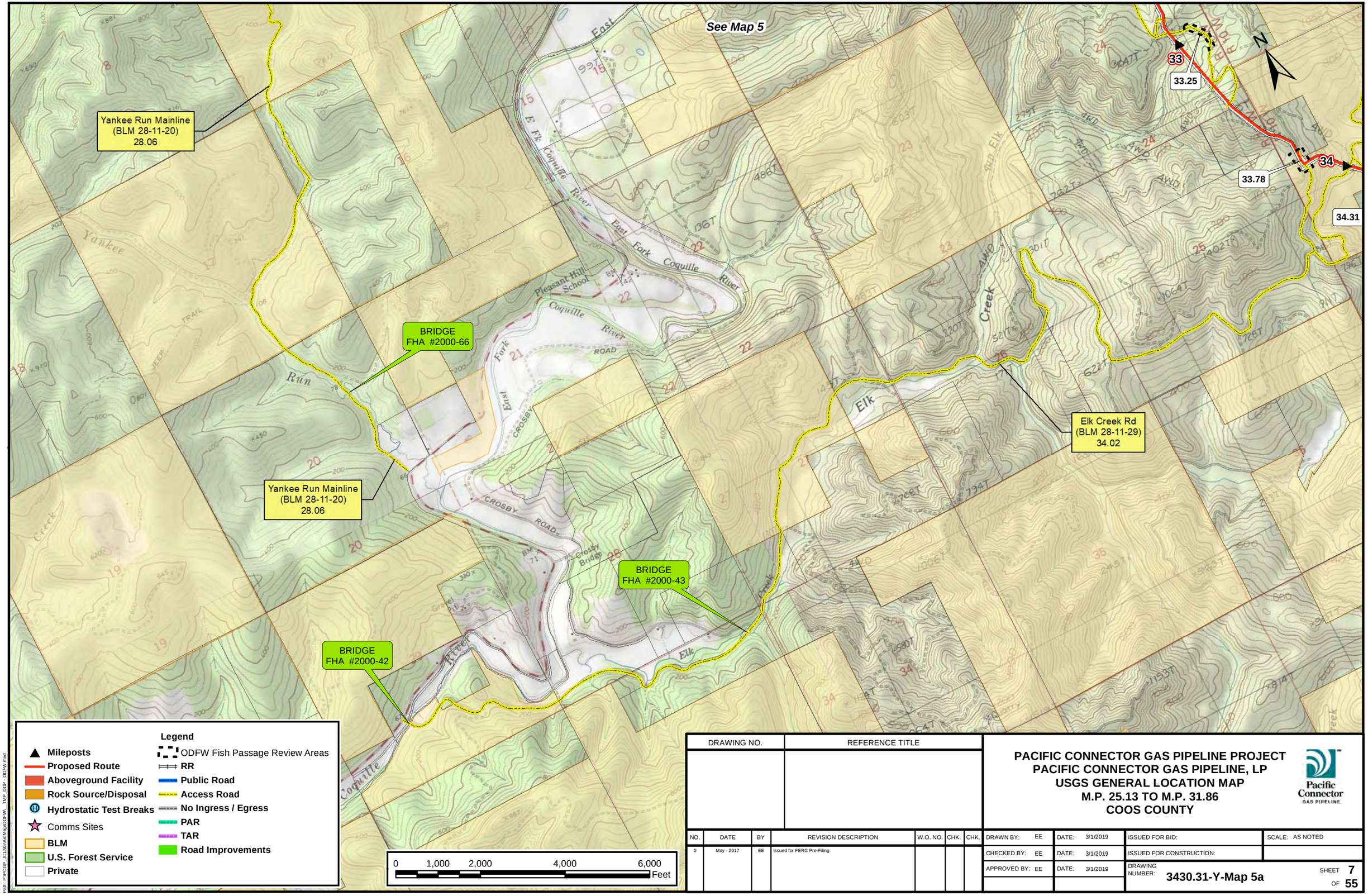

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 25.13 TO M.P. 31.86
COOS COUNTY

Pacific Connector GAS PIPELINE

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See Map 6b

Logging Spur (BLM NonInv 28-11-24.A) 32.35

Gold Brick Rd (BLM NonInv 28-11-24.B) 32.50

Gold Brick Rd 32.55

Logging Rd (BLM NonInv 28-11-24.B) 32.54

Logging Spur 32.86

32.10 & 3151

32.35 & 32.50

Unknown Rd (BLM NonInv 28-11-24.B) 33.25

Elk Creek Rd (BLM 28-11-29) 35.33 - 35.80

Logging Rd (BLM NonInv 28-10-19.B) 34.42

Logging Rd (BLM NonInv 28-11-24.B) 32.94

33.25

Gold Brick Rd 34.31

Elk Creek Rd (BLM 28-11-29) 35.83 - 36.11

34.69

Logging Rd 34.69

35.32 - 36.19

Elk Creek Rd (BLM 28-11-29) 36.64 - 37.15

Weaver Sitkum Tie Rd (BLM 28-10-9.4) 38.34 - 38.87

BLM 28-10-27.2 38.58

BLM 28-10-27 38.06

38.34 - 39.08

Cnty Rd 171 (Plum Creek Logging Spur) 38.98 - 39.22

Sandy Creek (BLM 29-10-15) 38.87

Sandy Creek Ext. (BLM 28-10-34.1) 38.87

Unknown Rd BLM Logging Spur 37.15 - 37.22

36.64 - 37.23

HYDROSTATIC TEST BREAK 37.20

Logging Spur (BLM NonInv 28-11-24.C) 33.37

33.78

34.69

HYDROSTATIC TEST BREAK 35.81

34.31 & 34.42

34.68 - 35.11

Logging Spur (BLM 28-10-29.2) 36.18

Elk Mountain Loop (BLM 28-11-25) 33.74 - 33.80

Elk Creek Rd (BLM 28-11-29) 34.02

Logging Spur (BLM NonInv 28-10-30.A) 34.71 - 35.04

Logging Spur (BLM NonInv 28-10-19.A) 34.37

10' x 200' Curve Widening

10' x 300' Curve Widening

Logging Spur (BLM NonInv 28-10-19.B) 34.44 - 34.52

Big Creek Rd (BLM 29-11-28) 38.87

Sandy Creek Ext. (BLM 29-10-2.1) 38.87

Sandy Creek (BLM 29-10-15) 38.87

Elk Creek Ext. (BLM 28-10-31) 35.80

See Map 6a

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 31.86 TO M.P. 39.01
COOS COUNTY

Pacific Connector GAS PIPELINE

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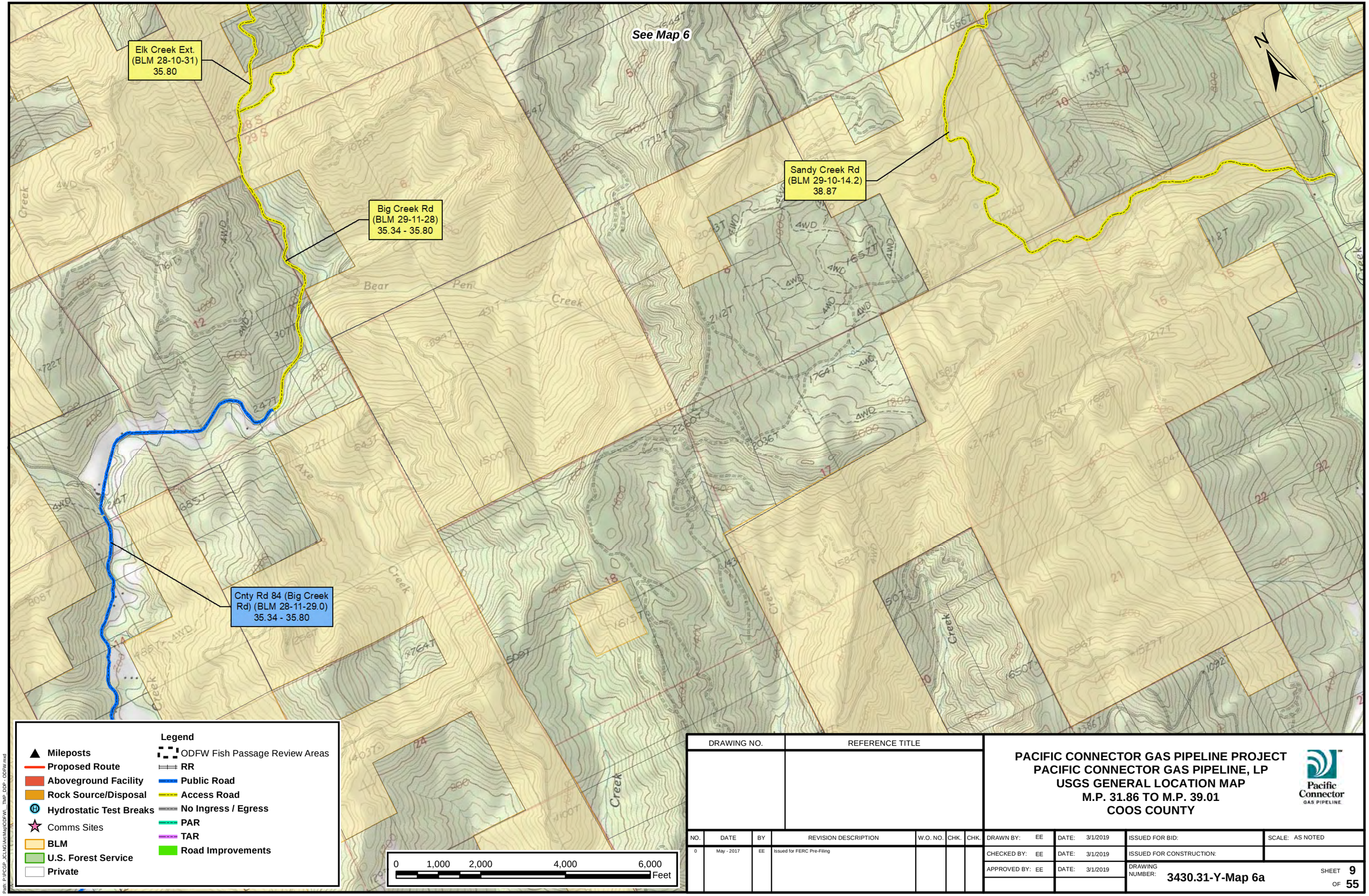

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PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 31.86 TO M.P. 39.01
COOS COUNTY

Pacific Connector GAS PIPELINE

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DRAWING NUMBER: 3430.31-Y-Map 6a		SHEET 9 OF 55	

BREWSTER LAKE
POTENTIAL DUST CONTROL
WATER SOURCE

Private Rd
38.00

Cnty Rd 1C (Weaver
Sitkum Tie Rd)
38.34 - 38.87

Chaney Rd
(BLM 28-10-9)
38.34 - 38.87

BRIDGE
FHS #2000-44

Gold
Brick Rd
32.10

32.10

Gold Brick Rd
32.55

Logging Spur
(BLM NonInv 28-11-24.A)
32.35

Gold Brick Rd
(BLM NonInv 28-11-24.B)
32.50

Dora Thinning Rd
(BLM 28-11-13)
32.10

32.10

Logging Rd
(BLM NonInv 28-11-24.B)
32.54

Logging Spur
32.86

32.10 & 3151

Unknown Rd
(BLM NonInv 28-11-24.B)
33.25

32.35 & 32.50

Dora Spur Rd
(BLM 28-11-13.2)
31.51

Logging Spur
(BLM NonInv 28-11-24.C)
33.37

Elk Creek Rd
(BLM 28-11-29)
35.33 - 35.80

Weaver Sitkum Tie
Rd (BLM 28-10-9.4)
38.34 - 38.87

38.34 -
39.08

See Map 6

34.69

33.78

0 1,000 2,000 4,000 6,000 Feet

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
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DRAWING NO.	REFERENCE TITLE

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USGS GENERAL LOCATION MAP
M.P. 31.86 TO M.P. 39.01
COOS COUNTY

Pacific Connector GAS PIPELINE

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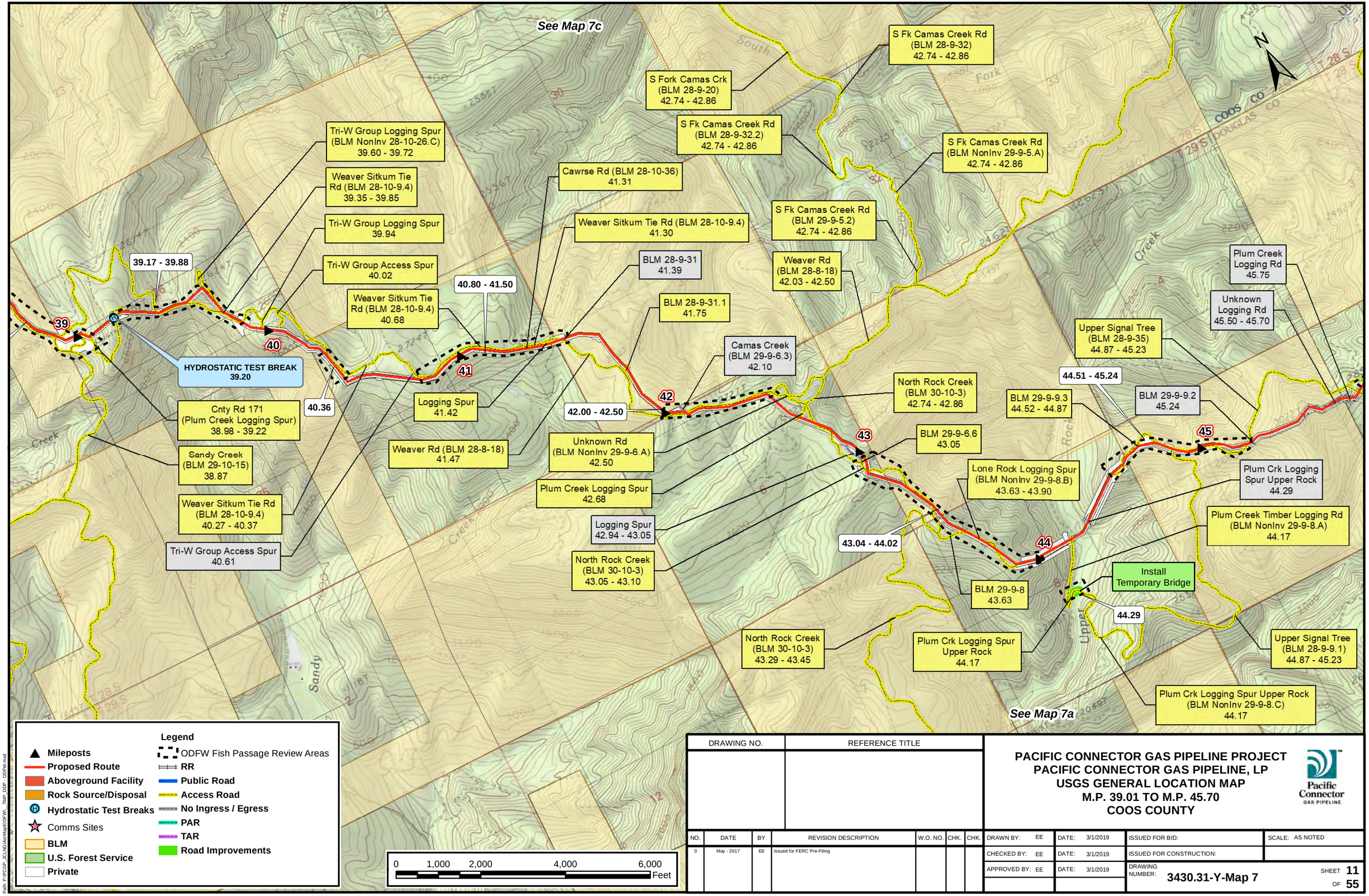

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 39.01 TO M.P. 45.70
COOS COUNTY

Pacific Connector GAS PIPELINE

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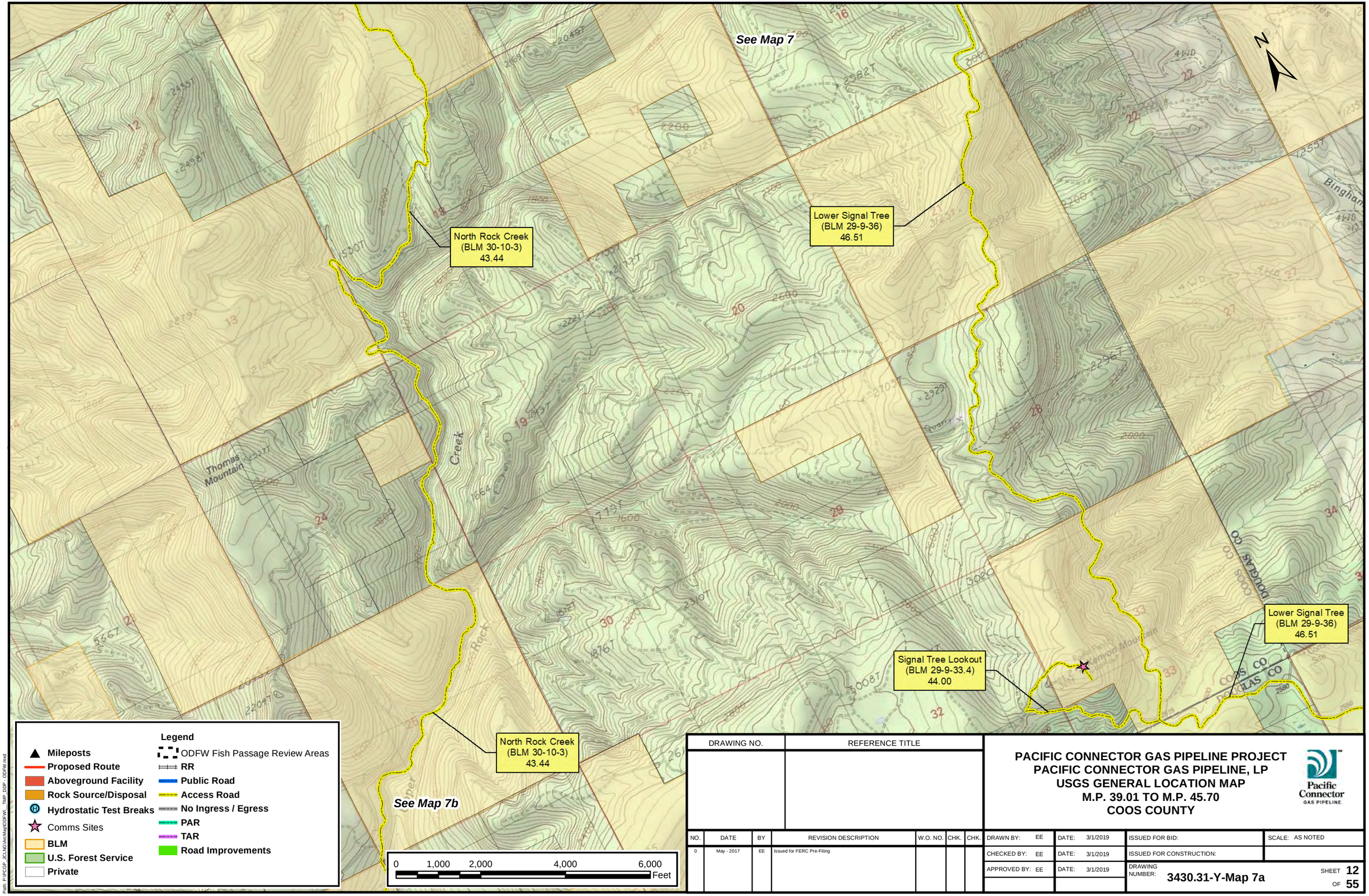

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PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 39.01 TO M.P. 45.70
COOS COUNTY

Pacific Connector GAS PIPELINE

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED
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See Map 7a

North Rock Creek
(BLM 30-10-3)
43.44

Signal Tree Lookout
(BLM 29-9-33.4)
44.00

Lower Signal Tree
(BLM 29-9-36)
46.51

BRIDGE
FHA #2000-52

BRIDGE
FHA #2000-51

Cnty Rd 21
43.44

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 39.01 TO M.P. 45.70
COOS COUNTY

Pacific Connector GAS PIPELINE

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Camas Creek Rd
(BLM 28-10-12)
42.74 - 42.86

Weaver Rd
(BLM 28-8-18)
42.03 - 42.50

S Fork Camas Crk
(BLM 28-9-20)
42.74 - 42.86

See Map 7

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

Path: P:\PCGP_JCLNG\ArcMap\ODFW_TMP_DDP - ODFW.mxd

DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
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PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 39.01 TO M.P. 45.70
COOS COUNTY

Pacific Connector GAS PIPELINE

DRAWN BY: EE	DATE: 3/1/2019	ISSUED FOR BID:	SCALE: AS NOTED
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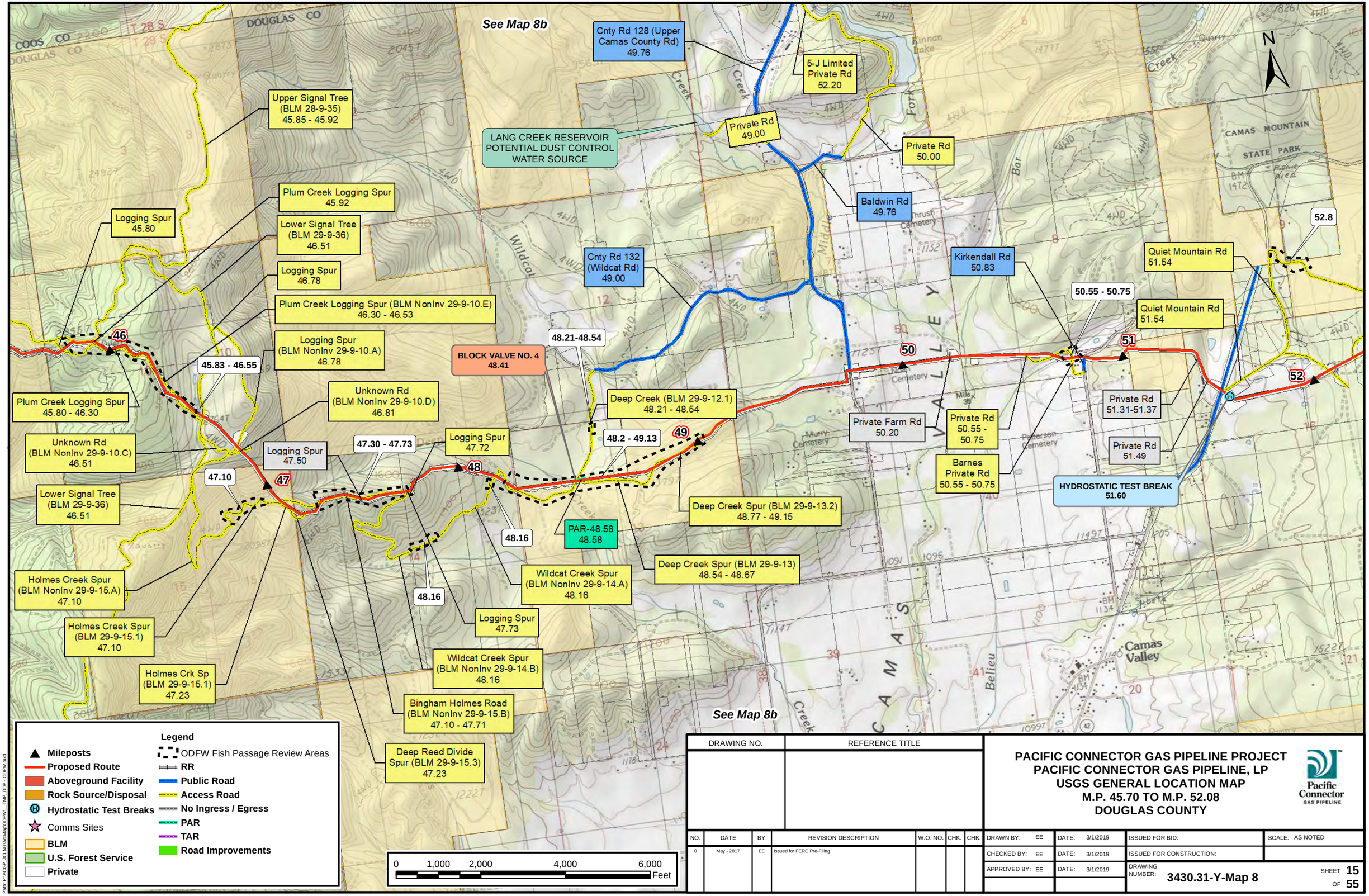
DRAWING NUMBER: **3430.31-Y-Map 7c**

SHEET **14** OF **55**



DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 45.70 TO M.P. 52.08
DOUGLAS COUNTY

Pacific Connector GAS PIPELINE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	CHK.
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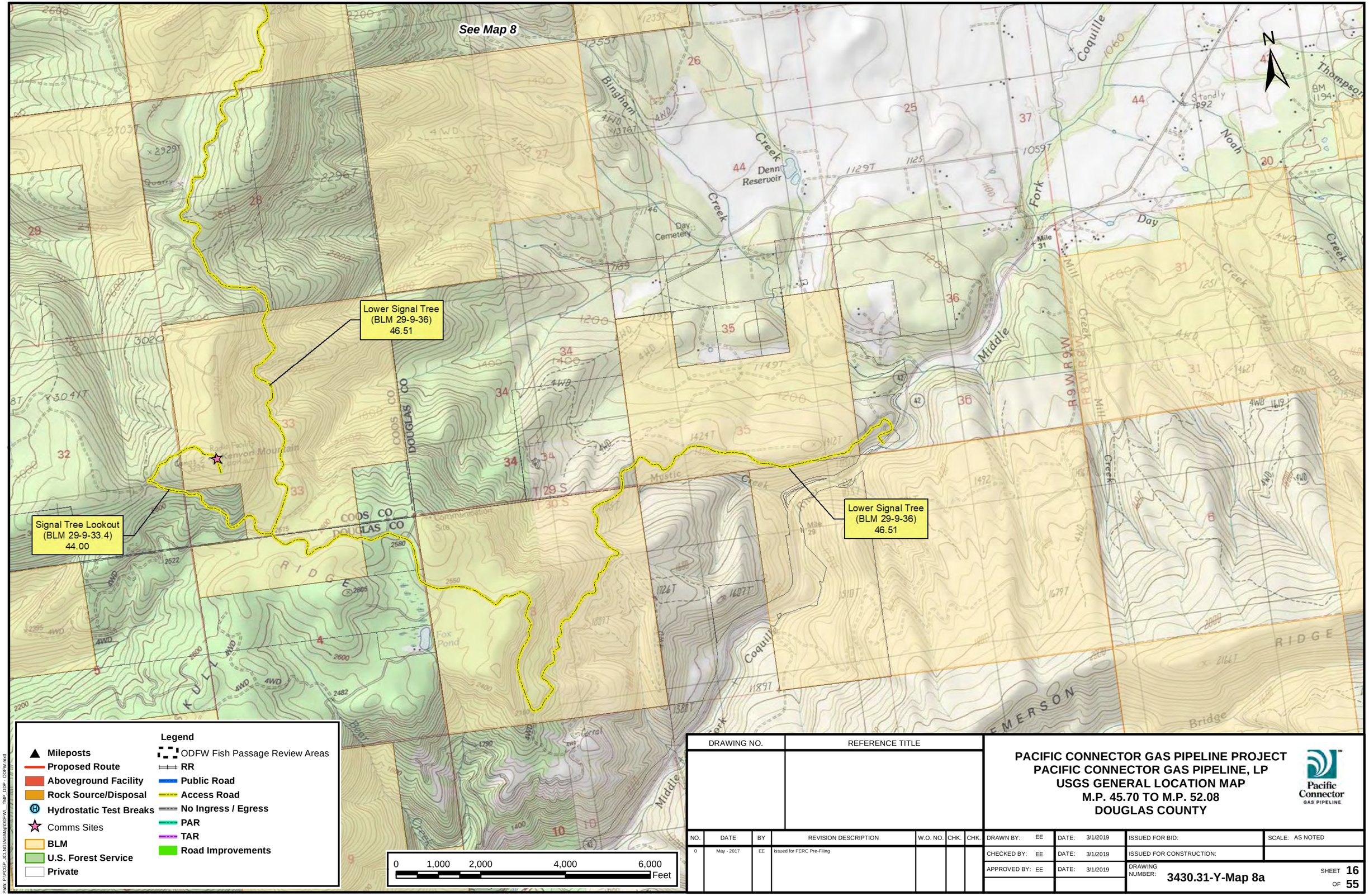

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 45.70 TO M.P. 52.08
DOUGLAS COUNTY

Pacific Connector GAS PIPELINE

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APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 8a	SHEET 16 OF 55		

Weaver Rd
(BLM 28-8-18)
42.03 - 42.50

Camas Weaver Tie Road
(BLM 28-9-25.1)
49.80

Weaver Rd
(BLM 28-8-18)
42.03 - 42.50

Upper Signal Tree
(BLM 28-9-35)
45.85 - 45.92

See Map 8

Legend

- Mileposts
- Proposed Route
- Aboveground Facility
- Rock Source/Disposal
- Hydrostatic Test Breaks
- Comms Sites
- BLM
- U.S. Forest Service
- Private
- ODFW Fish Passage Review Areas
- RR
- Public Road
- Access Road
- No Ingress / Egress
- PAR
- TAR
- Road Improvements

0 1,000 2,000 4,000 6,000 Feet

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PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 45.70 TO M.P. 52.08
DOUGLAS COUNTY

Pacific Connector GAS PIPELINE

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APPROVED BY: EE	DATE: 3/1/2019	DRAWING NUMBER: 3430.31-Y-Map 8b	SHEET 17 OF 55

Private Rd (BLM NonInv 29-8-16.A)
52.20

Camas Mountain SP
(BLM 29-8-9.3)
52.62

Shields Creek Spur
(BLM 29-8-2.2)
54.64

Cnty Rd 140 (Ireland)
55.81

Private Rd
56.06

Private Rd
(DG-039)
56.20

Private Rd
DG-041
56.32

Unknown Logging Rd
55.75

Logging Spur
(BLM NonInv 29-8-11.A)
54.21 - 54.35

Logging Spur
55.42

Shields Creek Spur
(BLM 29-8-11)
54.20

Shields Creek Sp
BLM 29-8-11.2)
53.74

Cnty Rd 140 (Ireland)
56.74

Cnty Rd 141
(Benedict Rd)
56.74

Private Rd
58.19

Private Rd
56.91

Cnty Rd 365
(Berry Creek Access Rd)
(BLM 29-8-1)
55.81

Cnty Rd 38
(Upper Olalla)
57.60

Private Rd (BLM 29-8-10)
52.20

Private Rd
52.20

Private Rd
52.11

Private Rd
52.07

Private Rd
52.01

Shields Creek Rd
(BLM 29-8-2.2)
54.64

Shields Creek Rd
(BLM 29-8-2.2)
53.21 - 53.59

Seneca Logging Spur (BLM NonInv 29-8-12.C)
54.87 - 55.05

Seneca Logging Spur (BLM NonInv 29-8-12.B)
54.87

BLM NonInv 29-8-12.A
54.64

Private Rd
57.35

Private Rd
57.10

Private Logging Rd (Camas Mountain SP)
(BLM NonInv 29-8-10.A)
53.03

HYDROSTATIC
TEST WATER SOURCE

HYDROSTATIC
TEST WATER SOURCE

Cnty Rd 365A
(Ben Irving Rd)
55.81

Berry Creek Access
Rd (BLM 29-8-1)
55.81

52.8

52

53

54

55

56

57

58

CAMAS MOUNTAIN STATE PARK

Shields Creek

Porter Hill

McCulloch Cemetery

Quarry

Picnic Area

Boat Ramp

Ben Irving Reservoir

Elev 913

Dickerson

N

0 1,000 2,000 4,000 6,000 Feet

Legend

- Mileposts
- Proposed Route
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Path: P:\PCGP_JC\NGVec\Map\ODFW_ TMP_ DSP - ODFW.mxd

DRAWING NO.	REFERENCE TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
USGS GENERAL LOCATION MAP
M.P. 52.08 TO M.P. 58.55
DOUGLAS COUNTY

Pacific Connector GAS PIPELINE

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Attachment 2

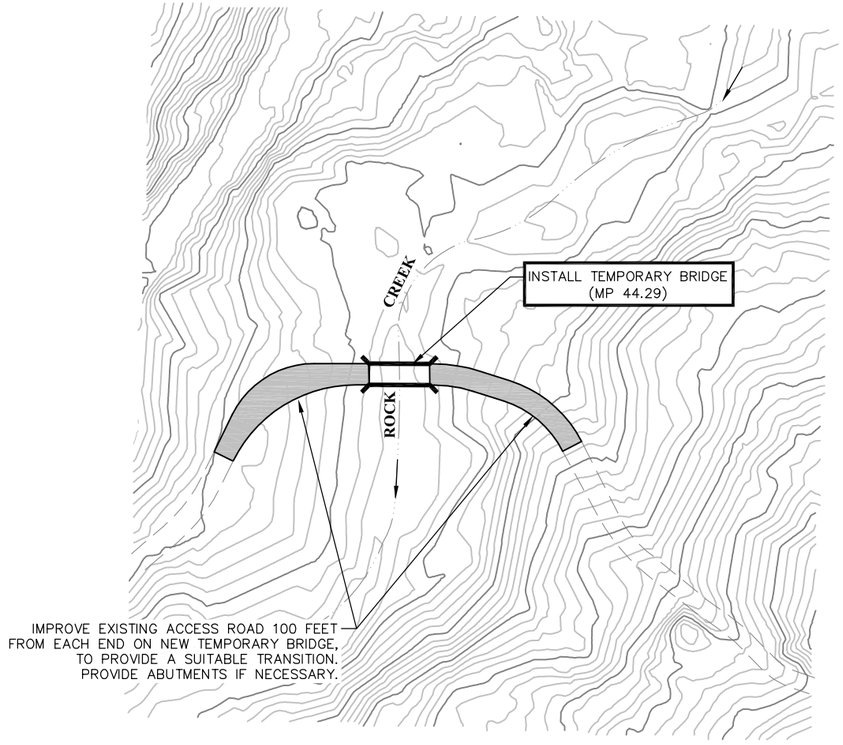
Crossing Photo Upper Rock Creek –

Plum Crk Logging Spur Upper Rock BLM 29-9-8.A /
Plum Crk Logging Spur Upper Rock BLM 29-9-8.C
(MP 44.17)

Photo 1.
Proposed Temporary Bridge Installation (MP 44.29) Location at the Existing Crossing of Upper Rock Creek on Upper Plum Crk Logging Spur Upper Rock BLM 29-9-8.A / Plum Crk Logging Spur Upper Rock BLM 29-9-8.C (MP 44.17).

Attachment 3

Bridge Location Plan View
and
Typical Temporary Bridge Design



PLAN SCALE

50 0 50 100

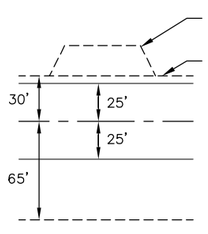
ACCESS ROAD IMPROVEMENTS - MP 44.29

N

EXISTING GROUND MAJOR CONTOURS - 10' INTERVALS

EXISTING GROUND MINOR CONTOURS - 2' INTERVALS

LEGEND



TEMPORARY EXTRA WORK AREA (TEWA)

CONSTRUCTION RIGHT-OF-WAY

PERMANENT RIGHT-OF-WAY

PROPOSED PACIFIC CONNECTOR GAS PIPELINE

PERMANENT RIGHT-OF-WAY

CONSTRUCTION RIGHT-OF-WAY

GRAVEL SURFACE

FILL AREA

CUT AREA

CULVERT

THE DYER PARTNERSHIP
ENGINEERS & PLANNERS, INC.
1330 TEAKWOOD AVENUE
COOS BAY, OREGON 97420
TELEPHONE: (541) 269-0732
www.dyerpart.com

LINE IS 1 INCH AT FULL SCALE
IF NOT 1INCH - SCALE ACCORDINGLY

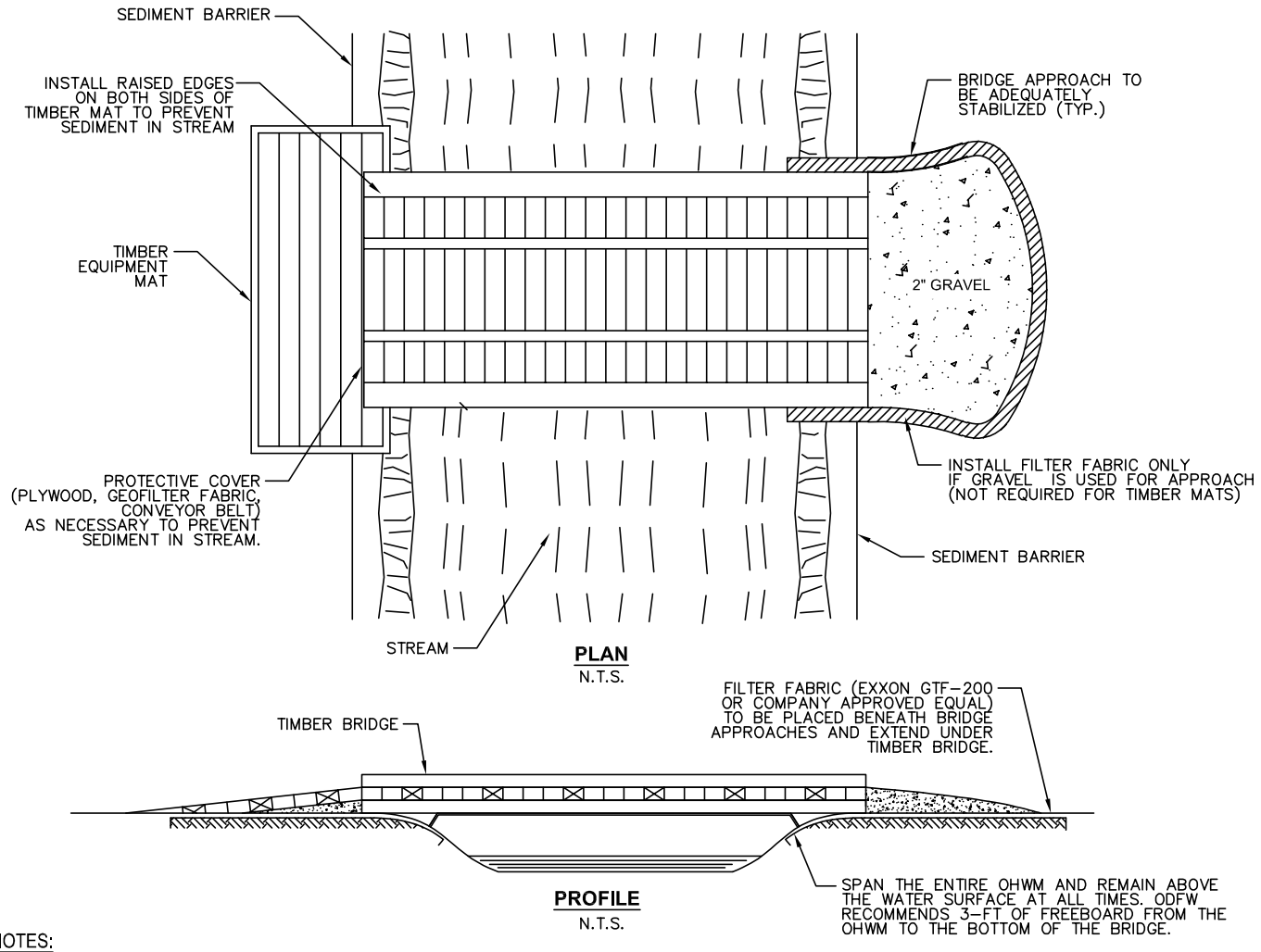
ACCESS ROAD IMPROVEMENT - PRELIMINARY ROUTING PLAN
PACIFIC CONNECTOR GAS PIPELINE, LP

ACCESS ROAD IMPROVEMENTS - MP 44.29
PLAN VIEW - TEMPORARY BRIDGE

PROJECT NO.	DRAWING NO.
900.53E	44.29C1
DATE	SHEET NO.
OCT 2015	27 OF 139

DETAIL 17

WATERBODY CROSSING TYPICAL
PORTABLE BRIDGE CROSSING WITHOUT CULVERTS



NOTES:

1. TIMBER BRIDGES SHALL BE ADEQUATELY ANCHORED AT ONE END.
2. BRIDGE APPROACHES SHALL BE EITHER COARSE AGGREGATE OR TIMBER EQUIPMENT MATS.
3. SEDIMENT AND DEBRIS SHALL NOT ENTER WATERBODY. PROVIDE RAISED EDGES ON BOTH BRIDGE EDGES AND PROTECTIVE COVER (PLYWOOD, GEOFILTER FABRIC, CONVEYOR BELT), AS NECESSARY, TO PREVENT SEDIMENT IN STREAM.
4. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE BUILD-UP OF SEDIMENT OR DEBRIS ON BRIDGE.
5. MATERIALS PLACED ALONG STREAM CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL OF THIS STRUCTURE IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
6. THE TIMBER BRIDGE SHALL BE DESIGNED TO SPAN THE ENTIRE OHWM OF THE WATERBODIES AND REMAIN ABOVE THE WATER SURFACE ELEVATION AT ALL TIMES. ODFW RECOMMENDS 3-FT OF FREEBOARD FROM THE OHWM/ACTIVE CHANNEL TO THE BOTTOM OF THE BRIDGE.
7. CONTRACTOR MAY USE MANUFACTURED PORTABLE BRIDGES OR RAIL CAR BRIDGES AS SUBSTITUTES FOR THE MEASURES SHOWN, IF APPROVED BY COMPANY REPRESENTATIVE.
8. MID-STREAM BRIDGE SUPPORTS PIERS OR CULVERTS SHALL BE USED TO PREVENT SETTLEMENT OF THE BRIDGE, IF NECESSARY. WHERE PIERS/CULVERTS ARE USED TO SUPPORT BRIDGES THEY SHALL NOT RESTRICT FLOW AND SHALL BE DESIGNED TO WITHSTAND AND PASS THE HIGHEST FLOW THAT WOULD OCCUR WHILE THE BRIDGE IS IN PLACE.
9. USE OF MID-STREAM BRIDGE SUPPORTS PIERS/CULVERTS WILL TRIGGER ODFW FISH PASSAGE PERMIT REQUIREMENTS AND APPROVALS BEFORE INSTALLATION.

Pacific Connector Gas Pipeline

NPS 36 KLAMATH TO JORDAN COVE
PIPELINE CROSSING DETAILS
PORTABLE BRIDGE CROSSING WITHOUT CULVERTS

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APPR. BY MM	SCALE NTS	PRINT ISSUED		SHEET NO. 1 OF 1	A